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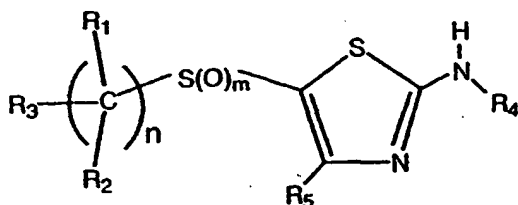
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(54) Title: AMINOTHIAZOLE INHIBITORS OF CYCLIN DEPENDENT KINASES



(I)

(57) Abstract: Compounds of formula (I) and pharmaceutically acceptable salts thereof. As used in formula (I), and throughout the specification, the symbols have the following meanings: R₁ and R₂ are independently hydrogen, fluorine or alkyl; R₃ is aryl or heteroaryl, R₄ has various meanings; R₅ is hydrogen or alkyl; m is an integer of 0 to 2; and n is an integer of 1 to 3. The compounds of formula (I) are pro-

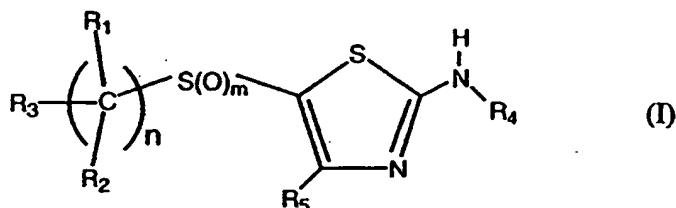
tein kinase inhibitors and are useful in the treatment and prevention of proliferative diseases, for example, cancer, inflammation and arthritis. They may also be useful in the treatment of neurodegenerative diseases such as Alzheimer's diseases cardiovascular diseases, viral diseases and fungal diseases.

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AMINOTHIAZOLE INHIBITORS OF CYCLIN DEPENDENT KINASES

Brief Description of the Invention

5 The present invention is directed to compounds of the formula



and pharmaceutically acceptable salts thereof. As used in formula I, and throughout the specification, the symbols have the following meanings:

R_1 and R_2 are independently hydrogen, fluorine or alkyl;

10 R_3 is aryl or heteroaryl

R_4 is alkyl, cycloalkyl, aryl, cycloalkylalkyl, arylalkyl, heteroaryl, heteroarylalkyl, heterocycloalkyl, heterocycloalkylalkyl; or

CO-alkyl, CO-cycloalkyl, CO-aryl, CO-alkyl-cycloalkyl, CO-alkyl-aryl,

15 CO-heteroaryl, CO-alkyl-heteroaryl, CO-heterocycloalkyl,

CO-alkyl-heterocycloalkyl; or

CONH-alkyl, CONH-cycloalkyl, CONH-aryl, CONH-alkyl-cycloalkyl,

CONH-alkyl-aryl, CONH-heteroaryl,

CONH-alkyl-heteroaryl, CONH-heterocycloalkyl,

20 CONH-alkyl-heterocycloalkyl; or

COO-alkyl, COO-cycloalkyl, COO-aryl, COO-alkyl-cycloalkyl,

COO-alkyl-aryl, COO-heteroaryl, COO-alkyl-heteroaryl,

COO-heterocycloalkyl, COO-alkyl-heterocycloalkyl; or

SO₂-cycloalkyl, SO₂-aryl, SO₂-alkyl-cycloalkyl, SO₂-alkyl-aryl,

25 SO₂-heteroaryl, SO₂-alkyl-heteroaryl, SO₂-heterocycloalkyl,

SO₂-alkyl-heterocycloalkyl; or

C(NCN)NH-alkyl, C(NCN)NH-cycloalkyl, C(NCN)NH-aryl,

C(NC(NH))-alkyl-cycloalkyl, C(NCN)NH-alkyl-aryl,

- C(NCN)NH-heteroaryl, C(NCN)NH-alkyl-heteroaryl,
 C(NCN)NH-heterocycloalkyl, C(NCN)NH-alkyl-heterocycloalkyl; or
 C(NNO₂)NH-alkyl, C(NNO₂)NH-cycloalkyl, C(NNO₂)NH-aryl,
 C(NNO₂)NH-alkyl-cycloalkyl, C(NNO₂)NH-alkyl-aryl,
 5 C(NNO₂)NH-heteroaryl, C(NNO₂)NH-alkyl-heteroaryl,
 C(NNO₂)NH-heterocycloalkyl, C(NNO₂)NH-alkyl-heterocycloalkyl;
 or
 C(NH)NH-alkyl, C(NH)NH-cycloalkyl, C(NH)NH-aryl,
 C(NH)NH-alkyl-cycloalkyl, C(NH)NH-alkyl-aryl,
 10 C(NH)NH-heteroaryl, C(NH)NH-alkyl-heteroaryl,
 C(NH)NH-heterocycloalkyl, C(NH)NH-alkyl-heterocycloalkyl; or
 C(NH)NHCO-alkyl, C(NH)NHCO-cycloalkyl, C(NH)NHCO-aryl,
 C(NH)NHCO-alkyl-cycloalkyl, C(NH)NHCO-alkyl-aryl,
 C(NH)NHCO-heteroaryl, C(NH)NHCO-alkyl-heteroaryl,
 15 C(NH)NHCO-heterocycloalkyl,
 C(NH)NHCO-alkyl-heterocycloalkyl; or
 C(NOR₆)NH-alkyl, C(NOR₆)NH-cycloalkyl, C(NOR₆)NH-aryl,
 C(NOR₆)NH-alkyl-cycloalkyl, C(NOR₆)NH-alkyl-aryl,
 C(NOR₆)NH-heteroaryl, C(NOR₆)NH-alkyl-heteroaryl,
 20 C(NOR₆)NH-heterocycloalkyl, C(NOR₆)NH-alkyl-heterocycloalkyl;
 R₅ is hydrogen or alkyl;
 R₆ is hydrogen, alkyl, cycloalkyl, aryl, cycloalkylalkyl,
 arylalkyl, heteroaryl, heteroarylalkyl, heterocycloalkyl or
 heterocycloalkylalkyl;
 25 m is an integer of 0 to 2; and
 n is an integer of 1 to 3.

The compounds of formula I are protein kinase inhibitors and are
 useful in the treatment and prevention of proliferative diseases, for
 example, cancer, inflammation and arthritis. They may also be useful in
 30 the treatment of neurodegenerative diseases such as Alzheimer's disease,
 cardiovascular diseases, viral diseases and fungal diseases.

Description of the Invention

The present invention provides for compounds of formula I,
5 pharmaceutical compositions employing such compounds and for methods
of using such compounds.

Listed below are definitions of various terms used to describe the
compounds of the instant invention. These definitions apply to the terms
as they are used throughout the specification (unless they are otherwise
10 limited in specific instances) either individually or as part of a larger
group.

It should be noted that any heteroatom with unsatisfied valances is
assumed to have the hydrogen atom to satisfy the valances.

Carboxylate anion refers to a negatively charged group -COO^- .

15 The term "alkyl" or "alk" refers to a monovalent alkane
(hydrocarbon) derived radical containing from 1 to 12 carbon atoms unless
otherwise defined. An alkyl group is an optionally substituted straight,
branched or cyclic saturated hydrocarbon group. When substituted, alkyl
groups may be substituted with up to four substituent groups, R as
20 defined, at any available point of attachment. When the alkyl group is
said to be substituted with an alkyl group, this is used interchangeably
with "branched alkyl group". Exemplary unsubstituted such groups
include methyl, ethyl, propyl, isopropyl, n-butyl, t-butyl, isobutyl, pentyl,
hexyl, isohexyl, heptyl, 4,4-dimethylpentyl, octyl, 2,2,4-trimethylpentyl,
25 nonyl, decyl, undecyl, dodecyl, and the like. Exemplary substituents may
include but are not limited to one or more of the following groups: halo
(such as F, Cl, Br, I), haloalkyl (such as CCl_3 or CF_3), alkoxy, alkylthio,
hydroxy, carboxy (-COOH), alkylloxycarbonyl
(-C(O)R), alkylcarbonyloxy (-OCOR), amino (-NH_2), carbamoyl
30 (-NHCOOR- or -OCONHR-), urea (-NHCONHR-) or thiol (-SH). Alkyl

groups as defined may also comprise one or more carbon to carbon double bonds or one or more carbon to carbon triple bonds.

The term "alkenyl" refers to a hydrocarbon radical straight, branched or cyclic containing from 2 to 12 carbon atoms and at least one carbon to carbon double bond.

The term "alkynyl" refers to a hydrocarbon radical straight, branched or cyclic containing from 2 to 12 carbon atoms and at least one carbon to carbon triple bond.

Cycloalkyl is a specie of alkyl containing from 3 to 15 carbon atoms, without alternating or resonating double bonds between carbon atoms. It may contain from 1 to 4 rings. Exemplary unsubstituted such groups include cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, adamantyl, etc. Exemplary substituents include one or more of the following groups: halogen, alkyl, alkoxy, alkyl hydroxy, amino, nitro, cyano, thiol and/or alkylthio.

The terms "alkoxy" or "alkylthio", as used herein, denote an alkyl group as described above bonded through an oxygen linkage (-O-) or a sulfur linkage (-S-), respectively.

The term "alkyloxycarbonyl", as used herein, denotes an alkoxy group bonded through a carbonyl group. An alkoxy carbonyl radical is represented by the formula: -C(O)OR, where the R group is a straight or branched C₁₋₆ alkyl group.

The term "alkylcarbonyl" refers to an alkyl group bonded through a carbonyl group.

The term "alkylcarbonyloxy", as used herein, denotes an alkylcarbonyl group which is bonded through an oxygen linkage.

The term "arylalkyl", as used herein, denotes an aromatic ring bonded to an alkyl group as described above.

The term "aryl" refers to monocyclic or bicyclic aromatic rings, e.g. phenyl, substituted phenyl and the like, as well as groups which are fused, e.g., naphthyl, phenanthrenyl and the like. An aryl group thus contains at

least one ring having at least 6 atoms, with up to five such rings being present, containing up to 22 atoms therein, with alternating (resonating) double bonds between adjacent carbon atoms or suitable heteroatoms.

Aryl groups may optionally be substituted with one or more groups including, but not limited to halogen, alkyl, alkoxy, hydroxy, carboxy, carbamoyl, alkyloxycarbonyl, nitro, trifluoromethyl, amino, cycloalkyl, cyano, alkyl S(O)_m (m=0, 1, 2), or thiol.

The term "heteroaryl" refers to a monocyclic aromatic hydrocarbon group having 5 or 6 ring atoms, or a bicyclic aromatic group having 8 to 10 atoms, containing at least one heteroatom, O, S, or N, in which a carbon or nitrogen atom is the point of attachment, and in which one or two additional carbon atoms is optionally replaced by a heteroatom selected from O or S, and in which from 1 to 3 additional carbon atoms are optionally replaced by nitrogen heteroatoms, said heteroaryl group being optionally substituted as described herein. Exemplary heteroaryl groups include the following: thienyl, furyl, pyrrolyl, pyridinyl, imidazolyl, pyrrolidinyl, piperidinyl, thiazolyl, oxazolyl, triazolyl, pyrazolyl, isoxazolyl, isothiazolyl, pyrazinyl, pyridazinyl, pyrimidinal, triazinylazepinyl, indolyl, isoindolyl, quinolinyl, isoquinolinyl, benzothiazolyl, benzoxazolyl, benzimidazolyl, benzoxadiazolyl, benzofurazanyl and tetrahydropyranlyl. Exemplary substituents include one or more of the following: halogen, alkyl, alkoxy, hydroxy, carboxy, carbamoyl, alkyloxycarbonyl, trifluoromethyl, cycloalkyl, nitro, cyano, amino, alkylS(O)_m (m=0, 1, 2), or thiol.

The term "heteroarylium" refers to heteroaryl groups bearing a quaternary nitrogen atom and thus a positive charge.

The term "heterocycloalkyl" refers to a cycloalkyl group (nonaromatic) in which one of the carbon atoms in the ring is replaced by a heteroatom selected from O, S or N, and in which up to three additional carbon atoms may be replaced by said heteroatoms.

The term "quaternary nitrogen" refers to a tetravalent positively charged nitrogen atom including, e.g. the positively charged nitrogen in a tetraalkylammonium group (e.g. tetramethylammonium, N-methylpyridinium), the positively charged nitrogen in protonated ammonium species (e.g. trimethylhydroammonium, N-hydropyridinium), the positively charged nitrogen in amine N-oxides (e.g. N-methyl-morpholine-N-oxide, pyridine -N-oxide), and the positively charged nitrogen in an N-amino-ammonium group (e.g. N-aminopyridinium).

10 The term "heteroatom" means O, S or N, selected on an independent basis.

The term "halogen" or "halo" refers to chlorine, bromine, fluorine or iodine.

When a functional group is termed "protected", this means that the group is in modified form to preclude undesired side reactions at the protected site. Suitable protecting groups for the compounds of the present invention will be recognized from the present application taking into account the level of skill in the art, and with reference to standard textbooks, such as Greene, T. W. et al., *Protective Groups in Organic*
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20 *Synthesis*, Wiley, N.Y. (1991).

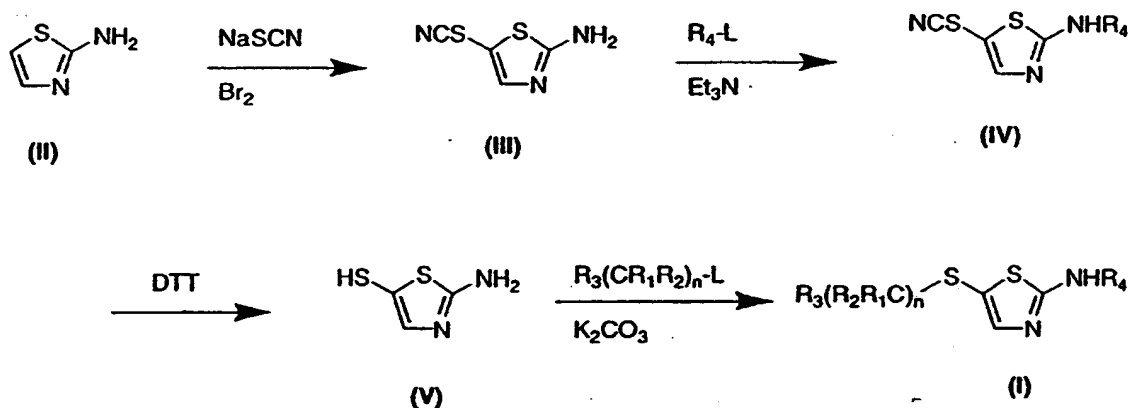
Suitable examples of salts of the compounds according to the invention with inorganic or organic acids are hydrochloride, hydrobromide, sulfate, phosphate. Salts which are unsuitable for pharmaceutical uses but which can be employed, for example, for the isolation or purification of free compounds I or their pharmaceutically acceptable salts, are also included.

All stereoisomers of the compounds of the instant invention are contemplated, either in admixture or in pure or substantially pure form. The definition of the compounds according to the invention embraces all possible stereoisomers and their mixtures. It very particularly embraces the racemic forms and the isolated optical isomers having the specified

activity. The racemic forms can be resolved by physical methods, such as, for example, fractional crystallization, separation or crystallization of diastereomeric derivatives or separation by chiral column chromatography. The individual optical isomers can be obtained from the racemates by conventional methods, such as, for example, salt formation with an optically active acid followed by crystallization.

It should be understood that solvates (e.g., hydrates) of the compounds of formula I are also within the scope of the present invention. Methods of solvation are generally known in the art. Accordingly, the compounds of the instant invention may be in the free or hydrate form, and may be obtained by methods exemplified by the following schemes.

Scheme 1

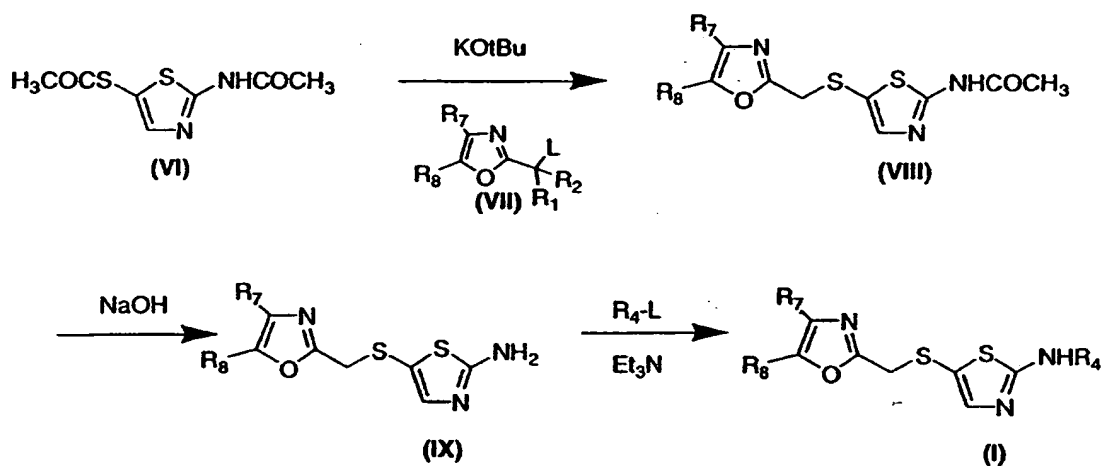


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As illustrated in Scheme 1, compounds of formula I where X is S are prepared by reacting 2-aminothiazole (II) with bromine in the presence of sodium or potassium thiocyanate to obtain a thiocyanated aminothiazole, specifically 5-thiocyanatoaminothiazole (III). Compound III is then reacted with $\text{R}_4\text{-L}$, where L is a leaving group such as a halogen, in the presence of a base such as triethylamine to provide a 5-thiocyanatothiazole intermediate (IV), where R_4 is as defined in the specification. The intermediate (IV) is then reduced to a thiol (V) using

reducing agents such as dithiothreitol (DTT), sodium borohydride, zinc or other known reducing agents. Compound (V) is then reacted with alkyl, aryl or heteroaryl halides, such as $R_3(CR_1R_2)_n-L$, where L is a leaving group such as a halogen, in the presence of a base such as potassium carbonate to obtain compounds of formula I. The steps of reducing the thiocyanothiazole intermediate (IV) to the thiol (V), and the reaction of the reduced thiol (V) to provide compounds of formula I where X is S, may be carried out sequentially without purification.

Scheme 2



In Scheme 2, 5-thioacetyl-2-acetylaminothiazole of structure VI is reacted with an alkoxide such as potassium *t*-butoxide in alcohol or THF solvent and the resulting thiol is reacted *in situ* with a group of formula $R_3(CR_1R_2)_n-L$ (where L is a leaving group, such as a halogen) such as 2-halomethyloxazole (VII) to provide a compound such as formula VIII, wherein R_1 and R_2 are hydrogen, and R_6 is acetyl. The 2-halomethyloxazole compounds of formula VII may be prepared using

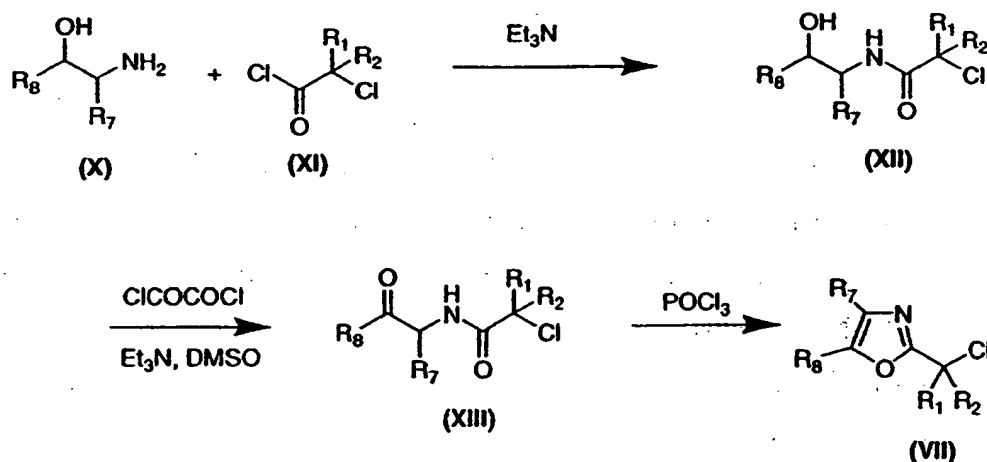
several synthetic routes known in the art. *Chem. Pharm. Bull.* 30, 1865 (1982); *Bull. Chem. Soc. Japan* (52, 3597 (1979); *JCS Chem. Comm.* 322 (1981); *Comprehensive Heterocyclic Chemistry*, vol. 6, 177, edited by A. Katritzky and C.W. Rees, Pergamon Press (1984).

- 5 Compounds of formula VIII (a compound of formula I where R_4 is acetyl and X is sulfur) can be hydrolyzed in the presence of a base such as sodium hydroxide to provide a compound of formula IX. A compound of formula IX may then be reacted with R_4 -L, in the presence of a base such as triethylamine, where L is a leaving group such as a halogen, to give
- 10 compounds of formula I where X is sulfur. In this manner, compounds of formula IX, which is a compound of formula I where R_4 is hydrogen, can be treated with agents such as isothiocyanates, halides, acyl halides, chloroformates, isocyanates or sulfonyl chlorides to provide thioureas, amines, amides, carbamates, ureas or sulfonamides. The procedures in
- 15 Scheme 2 specifically illustrate a methyloxazole group, but are general for all $R_3(CR_1R_2)_n$ - groups specified by formula I.

Alternatively, compounds of formula VII, where L is bromine, may be prepared by halogenation of 2-methyloxazole using N-bromosuccinimide in the presence of dibenzoylperoxide.

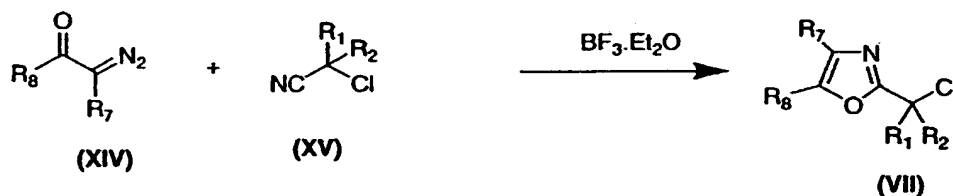
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Scheme 3



Scheme 3 illustrates an alternative method of preparing compound VII, which is a compound of formula $R_3(CR_1R_2)_n-L$ where L is chlorine and n is the integer 1. In this scheme, compound VII is prepared by the reaction of a compound of formula X and formula XI in the presence of a base such as triethylamine to provide compounds of formula XII. Compound XII may be oxidized by an oxidant such as oxalylchloride/DMSO in the presence of a base such as triethylamine to provide a compound of formula XIII which may be cyclized by an agent such as phosphorous oxychloride to provide compounds of formula VII, wherein L is chlorine. Alternatively, compounds of formula XIII may be prepared by reaction of the amino ketone corresponding to X with an acid chloride such as XI.

Scheme 4

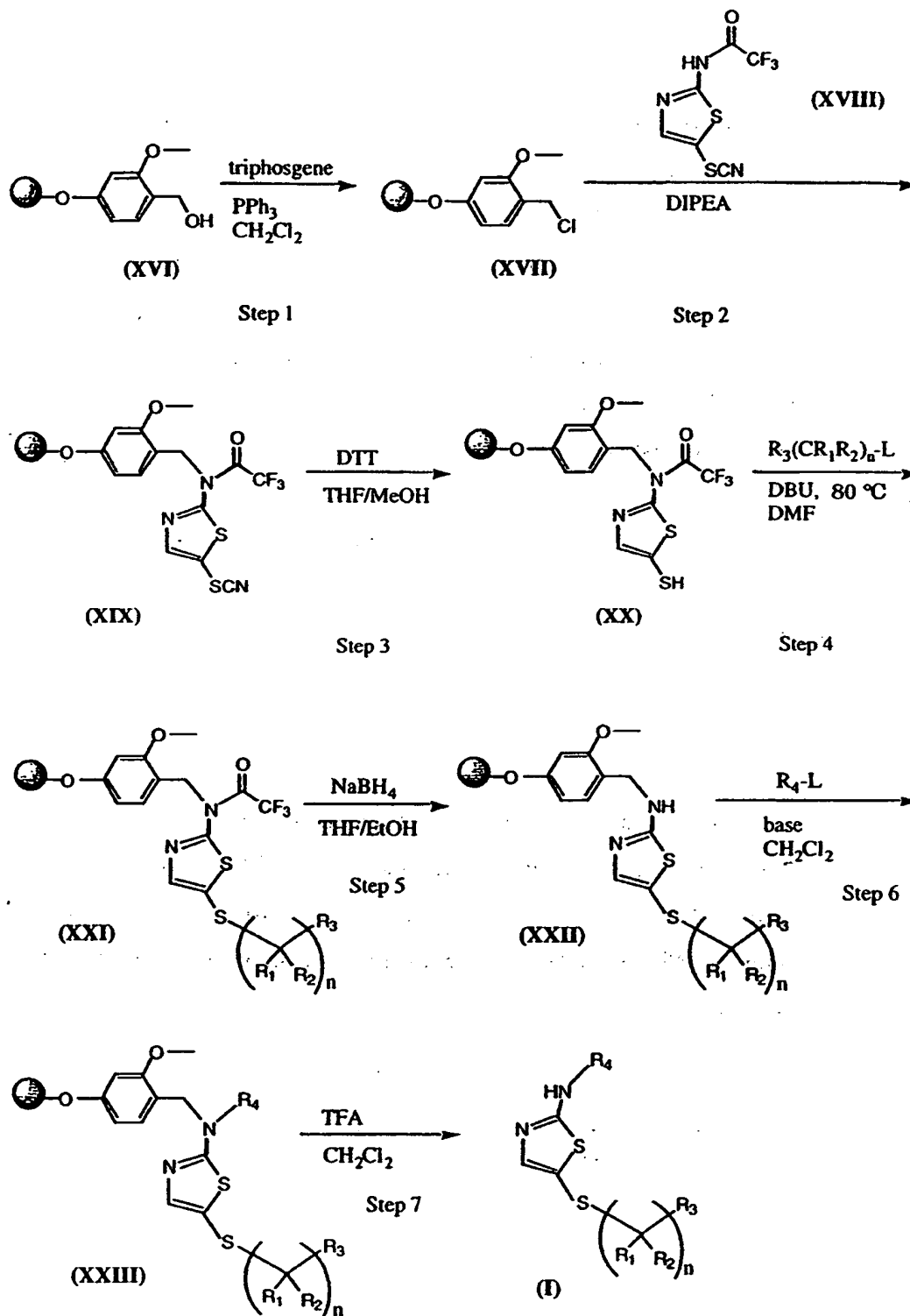


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Compounds of formula VII, where L is chlorine, may also be prepared from the reaction of diazoketones as illustrated by formula XIV in Scheme 4 with chloronitriles, such as indicated by formula XV, in the presence of BF_3 etherate to provide compounds of formula VII, wherein L is chlorine.

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Scheme 5



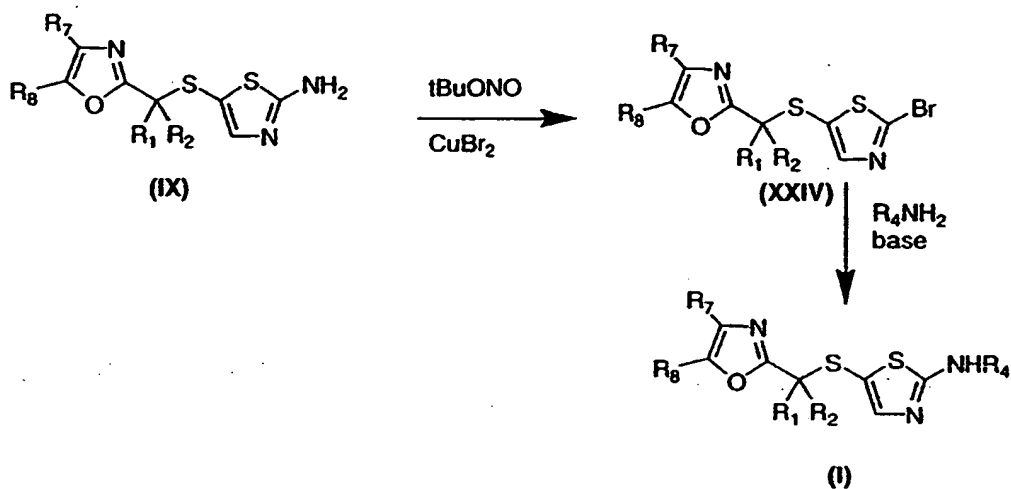
In Scheme 5, starting compound XVI denotes a resin-bound benzyl alcohol support used for solid phase synthesis which is prepared from a Merrifield resin denoted as $\textcircled{2}$, and 2-methoxy-4-hydroxybenzaldehyde, followed by reduction with reducing agents such as NaBH_4 . In step 1, starting compound XVI is treated with triphosgene and triphenylphosphine (PPh_3) in dichloromethane to give the chlorobenzyl resin of formula XVII. In step 2, a thiocyanato trifluoroacetamide (XVIII) is alkylated with the resin-bound benzyl chloride (XVII) in the presence of diisopropylethylamine (DIPEA) to form a resin-bound thiocyanate (XIX).

10 The thiocyanato trifluoroacetamide compound of formula XVII is prepared by reacting 5-thiocyanatoaminothiazole of formula III (Scheme I) with trifluoroacetic anhydride using a base such as 2,6-lutidine.

The resin-bound thiocyanate (XIX) is then reduced to a resin-bound thiol (XX) in step 3 with reducing agent such as dithiothreitol (DTT) in tetrahydrofuran (THF) and methanol. The resulting resin-bound thiol (XX) is reacted with $\text{R}_3(\text{CR}_1\text{R}_2)_n\text{-L}$, where L is a leaving group, in the presence of a base such as 1,8-diazabicyclo[5,4,0]undec-7-ene (DBU) at 80 °C in dimethylformamide (DMF) to form compounds of formula XXI (step 4). Deprotection of the trifluoroacetyl group of compound XXI is performed in step 5 using sodium borohydride to provide a compound of formula XXII. In step 6, the deprotected compound XXII is reacted with R_6X , where X is a leaving group, in the presence of a base such as diisopropylethylamine to provide compounds of formula XXIII. The product is then cleaved from the solid phase resin in step 7 with trifluoroacetic acid (TFA) to give compounds of formula I where X is sulfur. Compounds of formula I where X is $\text{S}(\text{O})_m$ and m is 1 or 2 may be prepared from compounds of formula I where m is 0 by oxidation with an oxidant such as sodium periodate, meta-chloroperbenzoic acid, or oxone.

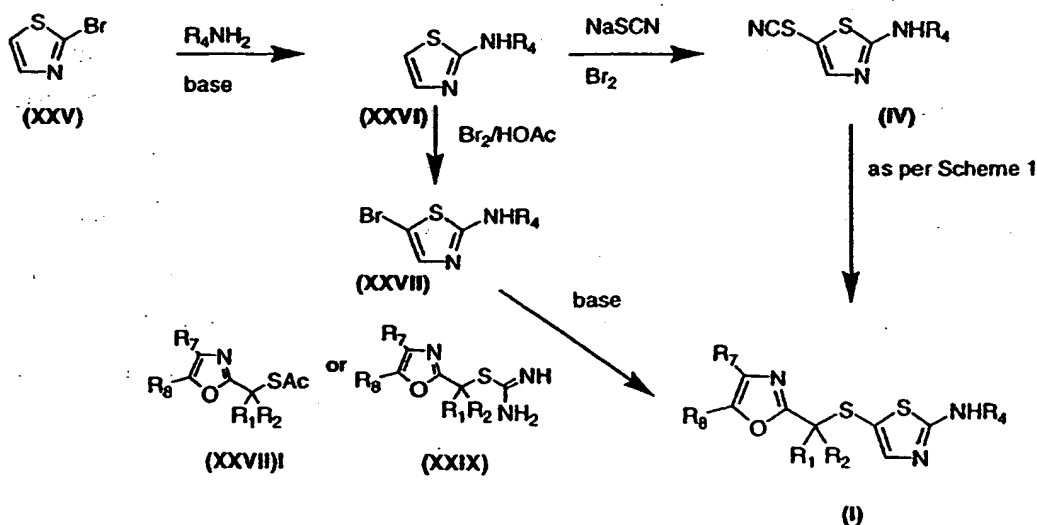
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Scheme 6



- 5 Scheme 6 illustrates the preparation of compounds of formula I from a 2-
 bromo thiazole XXIV. A compound of formula IX is reacted with a
 diazotizing agent such as $t\text{BuONO}$ in the presence of copper bromide to
 provide the exemplary 2-bromo thiazole of formula XXIV. Compound
 XXIV may then be reacted with a compound of formula R_4NH_2 , with or
 10 without an added base, to provide compounds of formula I.

Scheme 7



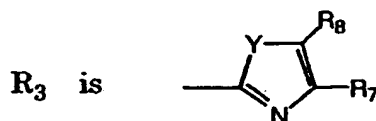
Compounds of formula I may also be prepared starting from 2-bromothiazole XXV by reaction with a compound of formula R_4NH_2 , with or without an added base, to provide a compound of formula XXVI. The compound of formula XXVI may be reacted with a thiocyanating agent such as sodium thiocyanate in the presence of bromine to provide a compound of formula IV, that may then be converted to a compound of formula I as described in Scheme 1. Alternatively, the compound of formula XXVI may be treated with a brominating agent such as bromine in acetic acid to generate a compound XXVII. Compounds of formula XXVII may be reacted with either XXVIII or XXIX (themselves available from a compound of formula VII) in the presence of base to provide compounds of formula I.

The starting compounds of Schemes 1-7 are commercially available or may be prepared by methods known to one of ordinary skill in the art.

All compounds of formula I may be prepared by modification of the procedures described herein.

The preferred compounds of formula I are those where:

R_1 and R_2 are independently hydrogen, fluorine or alkyl;



wherein Y is oxygen, sulfur or NR_9 ;

R_4 is alkyl, cycloalkyl, aryl, cycloalkylalkyl, arylalkyl, heteroaryl, heteroarylalkyl, heterocycloalkyl,

heterocycloalkylalkyl; or

CO-alkyl, CO-cycloalkyl, CO-aryl, CO-alkyl-cycloalkyl, CO-alkyl-aryl, CO-heteroaryl, CO-alkyl-heteroaryl, CO-heterocycloalkyl, CO-alkyl-heterocycloalkyl; or

CONH-alkyl, CONH-cycloalkyl, CONH-aryl, CONH-alkyl-cycloalkyl, CONH-alkyl-aryl, CONH-heteroaryl,

- CONH-alkyl-heteroaryl, CONH-heterocycloalkyl,
 CONH-alkyl-heterocycloalkyl; or
 COO-alkyl, COO-cycloalkyl, COO-aryl, COO-alkyl-cycloalkyl,
 COO-alkyl-aryl, COO-heteroaryl, COO-alkyl-heteroaryl,
 5 COO-heterocycloalkyl, COO-alkyl-heterocycloalkyl; or
 SO₂-cycloalkyl, SO₂-aryl, SO₂-alkyl-cycloalkyl, SO₂-alkyl-aryl,
 SO₂-heteroaryl, SO₂-alkyl-heteroaryl, SO₂-heterocycloalkyl,
 SO₂-alkyl-heterocycloalkyl; or
 C(NCN)NH-alkyl, C(NCN)NH-cycloalkyl, C(NCN)NH-aryl,
 10 C(NCN)NH-alkyl-cycloalkyl, C(NCN)NH-alkyl-aryl,
 C(NCN)NH-heteroaryl, C(NCN)NH-alkyl-heteroaryl,
 C(NCN)NH-heterocycloalkyl, C(NCN)NH-alkyl-heterocycloalkyl; or
 C(NNO₂)NH-alkyl, C(NNO₂)NH-cycloalkyl, C(NNO₂)NH-aryl,
 C(NNO₂)NH-alkyl-cycloalkyl, C(NNO₂)NH-alkyl-aryl,
 15 C(NNO₂)NH-heteroaryl, C(NNO₂)NH-alkyl-heteroaryl,
 C(NNO₂)NH-heterocycloalkyl, C(NNO₂)NH-alkyl-heterocycloalkyl;
 or
 C(NH)NH-alkyl, C(NH)NH-cycloalkyl, C(NH)NH-aryl,
 C(NH)NH-alkyl-cycloalkyl, C(NH)NH-alkyl-aryl,
 20 C(NH)NH-heteroaryl, C(NH)NH-alkyl-heteroaryl,
 C(NH)NH-heterocycloalkyl, C(NH)NH-alkyl-heterocycloalkyl; or
 C(NH)NHCO-alkyl, C(NH)NHCO-cycloalkyl, C(NH)NHCO-aryl,
 C(NH)NHCO-alkyl-cycloalkyl, C(NH)NHCO-alkyl-aryl,
 C(NH)NHCO-heteroaryl, C(NH)NHCO-alkyl-heteroaryl,
 25 C(NH)NHCO-heterocycloalkyl,
 C(NH)NHCO-alkyl-heterocycloalkyl; or
 C(NOR₆)NH-alkyl, C(NOR₆)NH-cycloalkyl, C(NOR₆)NH-aryl,
 C(NOR₆)NH-alkyl-cycloalkyl, C(NOR₆)NH-alkyl-aryl,
 C(NOR₆)NH-heteroaryl, C(NOR₆)NH-alkyl-heteroaryl,
 30 C(NOR₆)NH-heterocycloalkyl, C(NOR₆)NH-alkyl-heterocycloalkyl;
 R₅ is hydrogen; and

R₆ is hydrogen, alkyl, cycloalkyl, aryl, cycloalkylalkyl, arylalkyl, heteroaryl, heteroarylalkyl, heterocycloalkyl or heterocycloalkylalkyl;

R₇ and R₈ are independently hydrogen, alkyl, cycloalkyl, aryl, alkylcycloalkyl, alkylaryl, heteroaryl, alkylheteroaryl, heterocycloalkyl, alkylheterocycloalkyl or halogen;

R₉ is H or alkyl;

m is the integer 0; and

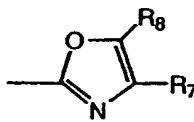
n is the integer 1.

The most preferred compounds of formula I are those where:

R₁ is hydrogen;

R₂ is hydrogen, fluorine or alkyl;

R₃ is a substituted oxazole having the configuration:



R₄ is CO-alkyl, CO-alkyl-aryl, CO-cycloalkyl, CO-alkyl-heteroaryl, CO-alkyl-heteroalkyl, CO-alkyl-heterocycloalkyl, aryl, arylalkyl, heteroaryl, heteroarylalkyl;

R₅ is hydrogen;

R₇ is hydrogen;

R₈ is an alkyl group, such as tert-butyl;

m is the integer 0; and

n is the integer 1.

The compounds according to the invention have pharmacological properties; in particular, the compounds of formula I are inhibitors of protein kinases such as the cyclin dependent kinases (cdks), for example, cdc2 (cdk1), cdk2, and cdk4. The novel compounds of formula I are expected to be useful in the therapy of proliferative diseases such as

cancer, autoimmune diseases, viral diseases, fungal diseases, neurodegenerative disorders and cardiovascular disease.

More specifically, the compounds of formula I are useful in the treatment of a variety of cancers, including (but not limited to) the following:

- carcinoma, including that of the bladder, breast, colon, kidney, liver, lung, including small cell lung cancer, esophagus, gall bladder, ovary, pancreas, stomach, cervix, thyroid, prostate, and skin, including squamous cell carcinoma;
- 10 -hematopoietic tumors of lymphoid lineage, including leukemia, acute lymphocytic leukemia, acute lymphoblastic leukemia, B-cell lymphoma, T-cell lymphoma, Hodgkins lymphoma, non-Hodgkins lymphoma, hairy cell lymphoma and Burkett's lymphoma;
- 15 -hematopoietic tumors of myeloid lineage, including acute and chronic myelogenous leukemias, myelodysplastic syndrome and promyelocytic leukemia;
- tumors of mesenchymal origin, including fibrosarcoma and rhabdomyosarcoma;
- 20 - tumors of the central and peripheral nervous system, including astrocytoma, neuroblastoma, glioma and schwannomas; and
- other tumors, including melanoma, seminoma, teratocarcinoma, osteosarcoma, xenoderoma pigmentosum, keratocanthoma, thyroid follicular cancer and Kaposi's
- 25 sarcoma.

Due to the key role of cdks in the regulation of cellular proliferation in general, inhibitors could act as reversible cytostatic agents which may be useful in the treatment of any disease process which features abnormal cellular proliferation, e.g., benign prostate hyperplasia, familial

30 adenomatosis polyposis, neuro-fibromatosis, atherosclerosis, pulmonary

fibrosis, arthritis, psoriasis, glomerulonephritis, restenosis following angioplasty or vascular surgery, hypertrophic scar formation, inflammatory bowel disease, transplantation rejection, endotoxic shock, and fungal infections.

- 5 Compounds of formula I may also be useful in the treatment of Alzheimer's disease, as suggested by the recent finding that cdk5 is involved in the phosphorylation of tau protein (*J. Biochem*, 117, 741-749 (1995)).

- Compounds of formula I may induce or inhibit apoptosis. The
10 apoptotic response is aberrant in a variety of human diseases. Compounds of formula I, as modulators of apoptosis, will be useful in the treatment of cancer (including but not limited to those types mentioned hereinabove), viral infections (including but not limited to herpesvirus, poxvirus, Epstein-Barr virus, Sindbis virus and adenovirus), prevention of
15 AIDS development in HIV-infected individuals, autoimmune diseases (including but not limited to systemic lupus, erythematosus, autoimmune mediated glomerulonephritis, rheumatoid arthritis, psoriasis, inflammatory bowel disease, and autoimmune diabetes mellitus), neurodegenerative disorders (including but not limited to Alzheimer's
20 disease, AIDS-related dementia, Parkinson's disease, amyotrophic lateral sclerosis, retinitis pigmentosa, spinal muscular atrophy and cerebellar degeneration), myelodysplastic syndromes, aplastic anemia, ischemic injury associated with myocardial infarctions, stroke and reperfusion injury, arrhythmia, atherosclerosis, toxin-induced or alcohol related liver
25 diseases, hematological diseases (including but not limited to chronic anemia and aplastic anemia), degenerative diseases of the musculoskeletal system (including but not limited to osteoporosis and arthritis) aspirin-sensitive rhinosinusitis, cystic fibrosis, multiple sclerosis, kidney diseases and cancer pain.

- 30 Compounds of formula I, as inhibitors of the cdks, can modulate the level of cellular RNA and DNA synthesis. These agents would therefore

be useful in the treatment of viral infections (including but not limited to HIV, human papilloma virus, herpesvirus, poxvirus, Epstein-Barr virus, Sindbis virus and adenovirus).

Compounds of formula I may also be useful in the chemoprevention of cancer. Chemoprevention is defined as inhibiting the development of invasive cancer by either blocking the initiating mutagenic event or by blocking the progression of pre-malignant cells that have already suffered an insult or inhibiting tumor relapse.

Compounds of formula I may also be useful in inhibiting tumor angiogenesis and metastasis.

Compounds of formula I may also act as inhibitors of other protein kinases, e.g., protein kinase C, her2, raf 1, MEK1, MAP kinase, EGF receptor, PDGF receptor, IGF receptor, PI3 kinase, weel kinase, Src, Abl and thus be effective in the treatment of diseases associated with other protein kinases.

The compounds of this invention may also be useful in combination (administered together or sequentially) with known anti-cancer treatments such as radiation therapy or with cytostatic or cytotoxic agents, such as for example, but not limited to, DNA interactive agents, such as cisplatin or doxorubicin; topoisomerase II inhibitors, such as etoposide; topoisomerase I inhibitors such as CPT-11 or topotecan; tubulin interacting agents, such as paclitaxel, docetaxel or the epothilones; hormonal agents, such as tamoxifen; thymidilate synthase inhibitors, such as 5-fluorouracil; and anti-metabolites, such as methoxtrexate.

Compounds of formula I may also be useful in combination with modulators of p53 transactivation.

If formulated as a fixed dose, such combination products employ the compounds of this invention within the dosage range described below and the other pharmaceutically active agent or treatment within its approved dosage range. For example, the cdc2 inhibitor olomucine has been found to act synergistically with known cytotoxic agents in inducing

apoptosis (*J. Cell Sci.*, 108, 2897 (1995)). Compounds of formula I may also be administered sequentially with known anticancer or cytotoxic agents when a combination formulation is inappropriate. The invention is not limited in the sequence of administration; compounds of formula I may
5 be administered either prior to or after administration of the known anticancer or cytotoxic agent. For example, the cytotoxic activity of the cyclin-dependent kinase inhibitor flavopiridol is affected by the sequence of administration with anticancer agents. *Cancer Research*, 57, 3375 (1997).

10 The pharmacological properties of the compounds of this invention may be confirmed by a number of pharmacological assays. The exemplified pharmacological assays which follow have been carried out with the compounds according to the invention and their salts. The compounds of examples 1 to 14 exhibited cdc2/cyclin B1 kinase activity
15 with IC₅₀ values less than 50 μ M. The compounds of examples 1 to 14 exhibited cdk2/cyclin E kinase activity with IC₅₀ values less than 50 μ M. The compounds of examples 1 to 14 exhibited cdk4/cyclin D1 kinase activity with IC₅₀ values less than 50 μ M.

20 **cdc2/cyclin B1 Kinase Assay**

cdc2/cyclin B1 kinase activity was determined by monitoring the incorporation of ³²P into histone H1. The reaction consisted of 50 ng baculovirus expressed GST-cdc2, 75 ng baculovirus expressed GST-cyclin B1, 1 μ g histone H1 (Boehringer Mannheim), 0.2 mCi of ³²P g-ATP and 25
25 mM ATP in kinase buffer (50 mM Tris, pH 8.0, 10 mM MgCl₂, 1 mM EGTA, 0.5 mM DTT). The reaction was incubated at 30°C for 30 minutes and then stopped by the addition of cold trichloroacetic acid (TCA) to a final concentration of 15% and incubated on ice for 20 minutes. The reaction was harvested onto GF/C unfilter plates (Packard) using a
30 Packard Filtermate Universal harvester, and the filters were counted on a Packard TopCount 96-well liquid scintillation counter (Marshak, D.R.,

Vanderberg, M.T., Bae, Y.S., Yu, I.J., *J. of Cellular Biochemistry*, 45, 391-400 (1991), incorporated by reference herein).

cdk2/cyclin E Kinase Assay

5 cdk2/cyclin E kinase activity was determined by monitoring the incorporation of ^{32}P into the retinoblastoma protein. The reaction consisted of 2.5 ng baculovirus expressed GST-cdk2/cyclin E, 500 ng bacterially produced GST-retinoblastoma protein (aa 776-928), 0.2 mCi ^{32}P γ -ATP and 25 mM ATP in kinase buffer (50 mM Hepes, pH 8.0, 10 mM MgCl_2 , 5 mM EGTA, 2 mM DTT). The reaction was incubated at 10 30°C for 30 minutes and then stopped by the addition of cold trichloroacetic acid (TCA) to a final concentration of 15% and incubated on ice for 20 minutes. The reaction was harvested onto GF/C unfilter plates (Packard) using a Packard Filtermate Universal harvester, and the filters 15 were counted on a Packard TopCount 96-well liquid scintillation counter.

cdk 4/cyclin D1 Kinase Activity

cdk4/cyclin D1 kinase activity was determined by monitoring the incorporation of ^{32}P in to the retinoblastoma protein. The reaction 20 consisted of 165 ng baculovirus expressed as GST-cdk4, 282 ng bacterially expressed as S-tag cyclin D1, 500 ng bacterially produced GST-retinoblastoma protein (aa 776-928), 0.2 μCi ^{32}P γ -ATP and 25 μM ATP in kinase buffer (50 mM Hepes, pH 8.0, 10 mM MgCl_2 , 5 mM EGTA, 2 mM DTT). The reaction was incubated at 30°C for 1 hour and then stopped by 25 the addition of cold trichloroacetic acid (TCA) to a final concentration of 15% and incubated on ice for 20 minutes. The reaction was harvested onto GF/C unfilter plates (Packard) using a Packard Filtermate Universal harvester, and the filters were counted on a Packard TopCount 96-well liquid scintillation counter (Coleman, K.G., Wautlet, B.S., Morissey, D, 30 Mulheron, J.G., Sedman, S., Brinkley, P., Price, S., Wedster, K.R. (1997). Identification of CDK4 Sequences involved in cyclin D, and p16 binding. *J. Biol. Chem.* 272,30:18869-18874, incorporated by reference herein).

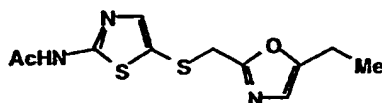
Further subject matter of the invention also includes pharmaceuticals for use as described above including controlling cancer, inflammation and arthritis, which contain at least one compound of the formula I as defined above or at least one of its pharmacologically acceptable acid addition salts, and the use of a compound of the formula I as defined above for the preparation of a pharmaceutical having activity against proliferative diseases as described previously including against cancer, inflammation and/or arthritis.

The following examples and preparations describe the manner and process of making and using the invention and are illustrative rather than limiting. It should be understood that there may be other embodiments which fall within the spirit and scope of the invention as defined by the claims appended hereto.

15

Example 1

N-[5-[[[(5-ethyl-2-oxazolyl)methyl]thio]-2-thiazolyl]acetamide



A. Preparation of 1-benzyloxycarbonylamino-2-butanol

A mixture of 1-amino-2-butanol (5.5 g, 61.8 mmol), benzyl chloroformate (11.5 g, 67.6 mmol) and sodium carbonate (7.16 g, 67.7 mmol) in water (50 mL) was stirred at 0 °C for 3 h. Water (50 mL) was added to the reaction mixture and the product was extracted with methylene chloride (3x20 mL). The methylene chloride extract was dried over Na₂SO₄ and concentrated. The residue was passed through a short column (SiO₂, hexanes : ethyl acetate /10 : 1; then ethyl acetate) to afford 1-benzyloxycarbonylamino-2-butanol (13.9 g, 100%) as a liquid.

^1H NMR (CDCl_3) δ 7.30 (m, 5 H), 5.45 (s, 1 H), 5.06 (s, 2 H), 3.57 (s, 1 H), 3.31 (m, 1 H), 3.04 (m, 1 H), 2.91 (m, 1 H), 1.43 (m, 2 H), 0.91 (t, $J = 7.6$ Hz, 3 H).

5 **B. Preparation of 1-benzyloxycarbonylamino-2-butanone**

To methylene chloride (60 mL) at -78°C under argon was added oxalyl chloride (37 mL of 2 M solution in methylene chloride, 74 mmol), followed by DMSO (7.8 g, 100 mmol). The mixture was stirred at -78°C for 20 min. and to this mixture was added a solution of 1-benzyloxycarbonylamino-2-butanol
10 (13.9 g, 61.8 mmol) in methylene chloride (40 mL). The mixture was stirred at -78°C for 1 h and triethylamine (21 mL) was added to the mixture. It was warmed to room temperature (rt) and washed successively with 1 N hydrochloric acid and aqueous sodium bicarbonate solution. The methylene chloride solution was dried over MgSO_4 and concentrated to afford 1-
15 benzyloxycarbonylamino-2-butanone (11.2 g, 82%) as a solid, which was enough pure for the next reaction.

^1H NMR (CDCl_3) δ 7.32 (m, 5 H), 5.50 (s, 1 H), 5.06 (s, 2 H), 4.07 (s, 2 H), 2.43 (q, $J = 7.6$ Hz, 2 H), 1.06 (t, $J = 7.6$ Hz, 3 H).

20 **C. Preparation of 1-amino-2-butanone**

A solution of 1-benzyloxycarbonylamino-2-butanone (9.30 mg, 42 mmol) in ethanol (50 mL) and 1 N hydrochloric acid (46 mL) was stirred under hydrogen atmosphere in the presence of Pd/C (1.5 g, 10%) at rt for 4 h. The mixture was filtered through a celite bed and the filtrate solution was
25 concentrated. The residue was triturated with ethyl ether to afford 1-amino-2-butanone (5.3 g, 102%) as a hydrochloride salt.

^1H NMR (CD_3OD) δ 3.97 (s, 2 H), 2.60 (q, $J = 7.6$ Hz, 2 H), 1.08 (t, $J = 7.6$ Hz, 3 H).

D. Preparation of 2-amino-5-thiocyanatothiazole

2-Aminothiazole (41g, 410 mM) and sodium thiocyanate (60 g, 740 mM, dried in a vacuum oven at 130 °C overnight) was dissolved in 450 mL of anhydrous methanol and the solution was cooled in a cold water bath.

5 Here was added bromine (23 mL, 445 mM) dropwise with good stirring. After the addition it was stirred for 4 h at rt. To the mixture 500 mL of water was added and it was stirred for 5 minutes, filtered through a celite bed and washed the bed with water. The pH of the filtrate solution was about 1. Most of the methanol was removed under the reduced pressure

10 and pH of the solution was adjusted to about 7 by adding aq. sodium carbonate slowly with stirring. The precipitated solid was filtered and washed with water to obtain 37 g (57%) of the dark brown colored desired product after drying, mp 140-143 °C.

^1H NMR (CD_3OD) δ 7.33 (s, 1H); MS (Cl/NH_3) m/e 179 ($\text{M}+\text{Na}$)⁺,
15 158($\text{M}+\text{H}$)⁺.

E. Preparation of 2-acetylamino-5-thiocyanatothiazole

To a mixture of 2-amino-5-thiocyanatothiazole (15.7 g, 0.1 mol) and pyridine (12 g, 0.15 mol) in methylene chloride (100 mL) was added acetic anhydride (1.2 g, 0.12 mol) at rt. The mixture was stirred at rt for 6 h.

20 The mixture was concentrated to dryness and to the residue MeOH (50 mL) was added. The precipitates were collected and washed with water. The solid was dried and recrystallized from MeOH to afford 2-acetylamino-5-thiocyanatothiazole (15.2 g, 76%) as a solid, mp 212 °C.

25 ^1H NMR (CD_3OD) δ 7.79 (s, 1H), 2.23 (s, 3 H).

F. Preparation of [[2-(acetylamino)-5-thiazolyl]thio]acetic acid 1,1-dimethylethyl ester

To a mixture of 2-acetamino-5-thiocyanatothiazole (5.97 g, 30 mmol) in MeOH (360 mL) under argon was added dithiothreitol (9.26 g, 60

30

mmol) at rt. The mixture was stirred at rt for 2 h and it was concentrated to afford a reduced solid product. This solid product was dissolved in DMF (30 mL) and to this solution were added tert-butyl bromoacetate (5.85 g, 30 mmol) and potassium carbonate (5.0 g, 36 mmol). The mixture was stirred at rt for 2 h and water (200 mL) was added to the mixture. The precipitates were collected, washed with water and dried. The solid was dissolved in methylene chloride (100 mL) and MeOH (10 mL) and filtered through a silica gel pad. The filtrate solution was concentrated to afford the desired product (7.5 g, 87%) as a solid, mp 162-163 °C.

¹H NMR (CDCl₃) δ 12.2 (s, 1 H), 7.48 (s, 1 H), 3.37 (s, 2 H), 2.32 (s, 3 H), 1.45 (s, 9 H); MS m/e 289 (M+H)⁺, 287 (M-H)⁻.

HPLC (Column: YMC S3 ODS 4.6x150mm; flow rate: 2.5 mL/min; solvent system: 0-100% B in 8 min. Solvent A: 10% MeOH-90% water-0.2% H₃PO₄; Solvent B: 90% MeOH-10% Water-0.2% H₃PO₄; UV: 220 nm): retention time 6.44 min.

G. Preparation of [[2-(acetylamino)-5-thiazolyl]thio]acetic acid

A solution of [[2-(acetylamino)-5-thiazolyl]thio]acetic acid 1,1-dimethylethyl ester (4.32 g, 15 mmol) in methylene chloride (30 mL) and trifluoroacetic acid (20 mL) was stirred at rt overnight and concentrated *in vacuo*. To the residue was added ethyl ether (50 mL). The precipitated solid was collected, washed with ethyl ether and dried to afford the desired product (3.38 g, 97%) as a solid, mp 210 °C.

¹H NMR (CD₃OD) δ 7.48 (s, 1 H), 3.47 (s, 2 H), 2.20 (s, 3 H) ppm; MS m/e 231(M-H)⁻; HPLC (Column: Zorbax Rapid resolution C-18; flow rate: 2.5 mL/min; solvent system: 0-100% B in 8 min. Solvent A: 10% MeOH-90% water-0.2% H₃PO₄; Solvent B: 90% MeOH-10% Water-0.2% H₃PO₄; UV: 254 nm): retention time 4.32 min.

H. Preparation of [[2-(acetylamino)-5-thiazolyl]thio]-N-(2-oxobutyl)acetamide

- A mixture of [[2-(acetylamino)-5-thiazolyl]thio]acetic acid (9.0 g, 38.8 mmol), HOBT (5.94 g, 38.8 mmol) and
- 5 ethyldimethylaminopropylcarbodiimide hydrochloride salt (11.16 g, 58.2 mmol) in DMF (50 mL) was stirred at 0 °C for 0.5 h. To this mixture was added 1-amino-2-butanone hydrochloride (5.27 g, 42.7 mmol) followed by triethylamine (15 mL, 107.5 mmol). The mixture was stirred at 0 °C for 0.5 h and at rt for 1 h. Water (200 mL) was added to the mixture and the product
- 10 was extracted with methylene chloride containing 10% MeOH (5x100 mL). The methylene chloride extract was dried over Na₂SO₄ and concentrated. The residue was triturated with water and the precipitated solid product was collected by filtration. It was dried to obtain the desired product (10.5 g, 90%), mp 195-196 °C.
- 15 ¹H NMR (CDCl₃) δ 7.53 (s, 1 H), 4.14 (s, 2 H), 3.46 (s, 2 H), 2.50 (q, J = 7.6 Hz, 2 H), 2.25 (s, 3 H), 1.12 (t, J = 7.6 Hz, 3 H); MS m/e 302 (M+H)⁺. HPLC (Column: Zorbax Rapid resolution C-18; flow rate: 2.5 mL/min; solvent system: 0-100% B in 8 min. Solvent A: 10%MeOH-90%water-0.2%H₃PO₄; Solvent B: 90%MeOH-10%Water-0.2%H₃PO₄; UV: 254 nm):
- 20 retention time 4.36 min.

I. Preparation of N-[5-[[5-ethyl-2-oxazolyl)methyl]thio]-2-thiazolyl]acetamide

- To a solution of [[2-(acetylamino)-5-thiazolyl]thio]-N-(2-
- 25 oxobutyl)acetamide (10.5 g, 34.8 mmol) in acetic anhydride (100 mL) was added conc. sulfuric acid (10 mL). The mixture was stirred at 55-60 °C for 2 h and sodium acetate (15 g, 0.18 mol) was added to the mixture. The mixture was concentrated *in vacuo*. To the residue was added cold water (100 mL). The precipitated solid was collected, washed with water and dried. It was
- 30 purified by a flash column chromatography (SiO₂; methylene chloride :

MeOH / 100 : 5) to afford N-[5-[[[(5-ethyl-2-oxazolyl)methyl]thio]-2-thiazolyl]acetamide (4.2 g, 43%) as a solid, mp 147-148 °C.

¹H NMR (CDCl₃) δ 12.47 (s, 1 H), 7.29 (s, 1 H), 6.61 (s, 1 H), 3.91 (s, 2 H), 2.64 (q, J = 7.6 Hz, 2 H), 2.25 (s, 3 H), 1.21 (t, J = 7.6 Hz, 3 H) ppm; MS m/e

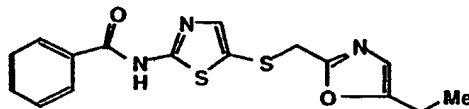
5 284 (M+H)⁺;

HPLC (Column: Zorbax Rapid resolution C-18; flow rate: 2.5 mL/min; solvent system: 0-100% B in 8 min. Solvent A: 10%MeOH-90%water-0.2%H₃PO₄; Solvent B: 90%MeOH-10%Water-0.2%H₃PO₄; UV: 254 nm): retention time 6.50 min.

10

Example 2

N-[5-[[[(5-ethyl-2-oxazolyl)methyl]thio]-2-thiazolyl]benzamide



15

A. Preparation of 2-amino-5-[[[(5-ethyl-2-oxazolyl)methyl]thio]-thiazole

A solution of N-[5-[[[(5-ethyl-2-oxazolyl)methyl]thio]-2-thiazolyl]acetamide (1.3 g, 4.6 mmol) in 1 N hydrochloric acid (15 mL) was stirred at 80-90 °C for 3 h. It was cooled to rt and the pH of the solution was adjusted to 7 with sodium carbonate. The product was extracted with methylene chloride (3x10 mL). The combined extract was dried over Na₂SO₄ and concentrated. The residue was triturated with ethyl ether and the precipitated solid was collected to afford 2-amino-5-[[[(5-ethyl-2-oxazolyl)methyl]thio]-thiazole (610 mg, 55%) as a solid, mp 119-120 °C.

25

¹H NMR (CDCl₃) δ 6.93 (s, 1 H), 6.61 (s, 1 H), 5.41 (s, 2 H), 3.82 (s, 3 H), 2.62 (q, J = 7.6 Hz, 2 H), 1.18 (t, J = 7.6 Hz, 3 H); MS m/e 242 (M+H)⁺;

HPLC (Column: Zorbax Rapid resolution C-18; flow rate: 2.5 mL/min; solvent system: 0-100% B in 8 min. Solvent A: 10%MeOH-90%water-0.2%H₃PO₄; Solvent B: 90%MeOH-10%Water-0.2%H₃PO₄; UV: 254 nm): retention time 3.96 min.

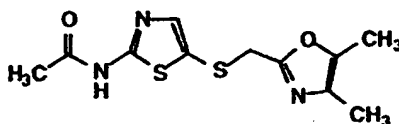
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B. Preparation of N-[5-[[[(5-ethyl-2-oxazolyl)methyl]thio]-2-thiazolyl]benzamide

- A mixture of 2-amino-5-[[[(5-ethyl-2-oxazolyl)methyl]thio]-thiazole (48.2 mg, 0.2 mmol), benzoyl chloride (24.4 mg, 0.21 mmol) and triethylamine (35 mg, 0.35 mmol) in methylene chloride (0.5 mL) was stirred at rt for 10 min. The organic solution was washed with water and concentrated. The residue was purified by a flash column (SiO₂; hexanes : ethyl acetate / 2 : 1) to afford N-[5-[[[(5-ethyl-2-oxazolyl)methyl]thio]-2-thiazolyl]benzamide (41 mg, 59%) as a solid, mp 122-123 °C.
- ¹H NMR (CDCl₃) δ 12.65 (s, 1 H), 7.96 (m, 2 H), 7.61 (m, 1 H), 7.49 (m, 2 H), 6.88 (s, 1 H), 6.56 (s, 1 H), 3.93 (s, 2 H), 2.61 (q, J = 7.6 Hz, 2 H), 1.20 (t, J = 7.6 Hz, 3 H); MS m/e 346 (M+H)⁺;
- HPLC (Column: Zorbax Rapid resolution C-18; flow rate: 2.5 mL/min; solvent system: 0-100% B in 8 min. Solvent A: 10%MeOH-90%water-0.2%H₃PO₄; Solvent B: 90%MeOH-10%Water-0.2%H₃PO₄; UV: 254 nm): retention time 7.94 min.

Example 3

- N-[5-[[[(4,5-dimethyl-2-oxazolyl)methyl]thio]-2-thiazolyl]acetamide**



A. Preparation of 2-(bromomethyl)-4,5-dimethyloxazole

A mixture of 2,4,5-trimethyloxazole (0.50 mL, 4.3 mmol), N-bromosuccinimide (0.77 g, 4.3 mmol) and benzoyl peroxide (0.21 g, 0.86 mmol) in carbon tetrachloride (4 mL) was heated at 76° C under nitrogen atm. for 3 hrs. After cooling to rt, the solid was removed by filtration. The filtrate solution was washed with saturated aqueous NaHCO₃ (20 mL) and concentrated. The residue was purified by flash column chromatography (SiO₂; hexanes:ethyl acetate / 4:1) to afford 2-(bromomethyl)-4,5-dimethyloxazole (64 mg) as a yellow oil.

¹H NMR (CDCl₃) δ 4.4 (s, 2 H), 2.25 (s, 3 H), 2.05 (s, 3 H).

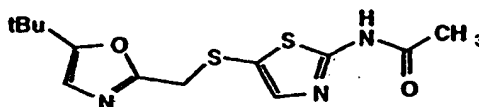
B. Preparation of N-[5-[(4,5-dimethyl-2-oxazolyl)methyl]thio]-2-thiazolyl]acetamide

N-[5-(Acetylthio)-2-thiazolyl]acetamide (0.050 g, 0.23 mmol) was dissolved in dry THF (10 ml) and here potassium *tert*-butoxide (1.0 M solution in THF, 0.25 ml, 0.25 mmol) was added to the mixture. The reaction mixture was stirred at rt for 15 min., and 2-(bromomethyl)-4,5-dimethyloxazole (0.064 g, 0.34 mmol) was added to this mixture. The reaction mixture was stirred at rt for 3 h and saturated aqueous NaHCO₃ solution (20 mL) was added to the mixture. The organic layer was separated and the aqueous layer was extracted with dichloromethane (3 x 20 mL). The combined organic layers was concentrated. The residue was purified by flash column chromatography (SiO₂; methanol:dichloromethane /1:20) to afford N-[5-[(4,5-dimethyl-2-oxazolyl)methyl]thio]-2-thiazolyl]acetamide (15 mg, 23%) as a yellow solid. ¹H NMR (CDCl₃) δ 11.78 (s, 1 H), 7.38 (s, 1 H), 3.90 (s, 2 H), 2.30 (s, 3H), 2.22 (s 3H), 2.05 (s, 3H); MS m/e 284 (M+H)⁺; HPLC (Column: Zorbax Rapid resolution C-18; flow rate: 2.5 ml/min; solvent system: 0-100% B in 8 min. Solvent A: 10% CH₃OH/90% H₂O/0.2%

H₃PO₄; Solvent B: 90% CH₃OH/10% H₂O/0.2% H₃PO₄; UV: 254 nm):
retention time 5.87 min.

Example 4

5 N-[5-[[[(5-t-butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]acetamide



10 A. Preparation of diazomethane

To a mixture of 15 ml of 40% aqueous KOH solution and 50 mL of diethyl ether at 0 °C was added 5 g (68 mmol) of N-methyl-N'-nitro-N-nitrosoguanidine in portions with stirring. The resulting mixture was stirred at 0 °C for 0.5 h. The organic phase was decanted into a dry flask
15 and dried over solid KOH pellets to give 50 mL of diazomethane solution (ca 0.5 M, by titrating with acetic acid).

B. Preparation of 1-diazo-3,3-dimethyl-2-butanone

To the diazomethane solution at 0 °C was added a solution of 1.23
20 mL (1.21 g, 10 mmol, Aldrich) of trimethylacetyl chloride in 1 mL of diethyl ether dropwise with stirring. The resulting mixture was kept at 0 °C for 16 h. The solution was sparged with argon to remove the excess diazomethane and diethyl ether was removed under reduced pressure to give 1.33 g (10 mmol, 100%) of crude 1-diazo-3,3-dimethyl-2-butanone as a
25 yellow liquid.

C. Preparation of 2-chloromethyl-5-t-butyloxazole

To a solution of 2 mL (2.3 g, 16 mmol) of boron trifluoride etherate in 20 mL of chloroacetonitrile at 0 °C was added a solution of 1.33 g (10

mmol) of 1-diazo-3,3-dimethyl-2-butanone in 5 mL of chloroacetonitrile dropwise. The resulting solution was stirred at 0 °C for 0.5 h. The reaction mixture was added to saturated aqueous sodium bicarbonate solution to neutralize the acid and the product was extracted three times with dichloromethane. The combined extracts was dried (sodium sulfate), concentrated and purified by flash column chromatography (Merck silica, 25 x 200 mm, dichloromethane) to give 1.1 g of 2-(chloromethyl)-5-t-butylloxazole as a yellow liquid (6.4 mmol, 64% overall from the acid chloride).

¹H NMR δ (CDCl₃): 1.30 (s, 9H), 4.58 (s, 2H), 6.68 (s, 1H); MS 174 (M+H)⁺; TLC: R_f (silica gel, dichloromethane)=0.33; HPLC: t_R (YMC S-3 ODS 4.6x50mm rapid resolution; 2.5 ml/min, gradient 0-100% B over 8 min, Solvent A: 10% CH₃OH/90% H₂O/0.2% H₃PO₄; Solvent B: 90% CH₃OH/10% H₂O/0.2% H₃PO₄; UV: 254 nm)= 6.5 min.

D. Preparation of N-[5-[[[(5-t-butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]acetamide

To a solution of 50 mg (0.23 mmol, Applied Chemical Laboratory) of N-[5-(acetylthio)-2-thiazolyl]acetamide in 10 mL of THF was added 0.25 mL of potassium tert-butoxide solution (1 M solution, 0.25 mmol) at rt under argon. The resulting suspension was stirred for 15 min at rt, then a solution of 59 mg of 2-(chloromethyl)-5-t-butylloxazole (0.34 mmol) in 1 mL of THF was added. The resulting mixture was stirred at rt for 16 h, concentrated under reduced pressure and purified by flash column chromatography (silica gel, 25 x 200 mm, 1:1 EtOAc/hexanes followed by 100% EtOAc) to give 44 mg (0.14 mmol, 61%) of N-[5-[[[(5-t-butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]acetamide as a white solid.

¹H NMR δ (CDCl₃) 1.27 (s, 9H), 2.27 (s, 3H), 3.95 (s, 2H), 6.59 (s, 1H), 7.31 (s, 1H), 11.03 (broad s, 1H); MS 312 (M+H)⁺;

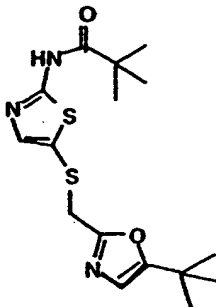
TLC: R_f (silica gel, ethyl acetate)=0.53, UV;

HPLC: retention time (YMC S-3 ODS 4.6x50mm rapid resolution; 2.5 ml/min, gradient 0-100%B over 8 min, Solvent A: 10% CH₃OH/90%

5 H₂O/0.2% H₃PO₄; Solvent B: 90% CH₃OH/10% H₂O/0.2% H₃PO₄; UV: 254 nm)= 6.8 min.

Example 5

N-[5-[[5-*t*-butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]
10 trimethylacetamide



A. Preparation of N-[(5-thiocyanato)-2-thiazolyl] trifluoroacetamide (XVIII)

15 To a mixture of 5-thiocyanato-2-aminothiazole (30 mmol) and 2,6-lutidine (35 mmol) in tetrahydrofuran (25 mL) and dichloromethane (50 mL) at -78 °C under argon was slowly added trifluoroacetic anhydride (33 mmol). After addition, the mixture was allowed to warm up to rt and stirred overnight. The mixture was diluted with dichloromethane (100
20 mL), and the organic solution was washed with 5% aqueous citric acid followed by brine, dried over magnesium sulfate and passed through a pad of silica gel. The product containing eluent was concentrated to afford 5.3 g of light brown solid.

¹H-NMR (CDCl₃) δ 12.4 (br, 1H), 7.83 (s, 1H).

**B. Preparation of 4-hydroxymethyl-3-methoxyphenyloxy
Merrifield resin (XVI)**

To the suspension of sodium hydride (11.7 g, 60% in mineral oil, 293 mmol) in dimethylformamide (30 mL) at 0 °C under argon was slowly
5 added a solution of 4-hydroxy-3-methoxybenzaldehyde (44.5 g, 292.5 mmol) in dimethylformamide (100 mL). To the resulting mixture Merrifield resin (1% DVB, from Advanced Chemtech, loading 1.24 mmol/g, 50 g, 62 mmol) and catalytic amount of tetra-n-butylammonium iodide were added, and it was heated at 65 °C for a day. The resin was filtered,
10 washed with water (2x), 50% dimethylformamide in water (3x), dimethylformamide (2x), and methanol (5x), and dried *in vacuo*. The dried resin (15 g) was treated with sodium borohydride (3.4 g, 90 mmol) in tetrahydrofuran (50 mL) and ethanol (50 mL) overnight. The resin was filtered, washed with 50% dimethylformamide in water (3x),
15 dimethylformamide (2x), methanol (2x), and dichloromethane (5x), and dried *in vacuo*.

**C. Preparation of 4-chloromethyl-3-methoxyphenyloxy
Merrifield resin (XVII)**

20 To a solution of triphenylphosphine (17 g, 65 mmol) in dichloromethane (200 mL) at 0 °C was slowly added triphosgene (9.2 g, 31 mmol) portionwise over a period of 30 minutes. After addition, the reaction mixture was stirred at 0 °C for 10 minutes. The solvent was removed *in vacuo* and the residue was redissolved in dichloromethane
25 (200 mL). To this mixture was added 4-hydroxymethyl-3-methoxyphenyloxy Merrifield resin (12 g). The resulting mixture was agitated for 4 h. The resin was washed with dry dichloromethane (6x) and dried *in vacuo*.

D. Preparation of 4-[N-[(5-thiocyanato)-2-thiazolyl]trifluoroacetamido]methyl-3-methoxyphenoxy Merrifield resin (XIX)

A mixture of 4-chloromethyl-3-methoxyphenoxy Merrifield resin (15g), N-[(5-thiocyanato)-2-thiazolyl]trifluoroacetamide (14 g, 55.3 mmol) and diisopropylethylamine (7.8 mL, 45 mmol) in dimethylformamide (50 mL) and dichloromethane (100 mL) was agitated overnight. The resin was washed with dimethylformamide (2x), methanol (2x), dichloromethane (4x), and dried *in vacuo*.

10

E. Preparation of 4-[[N-[(5-mercapto)-2-thiazolyl]trifluoroacetamido]methyl-3-methoxyphenoxy Merrifield resin (XX)

A mixture of 4-[N-[(5-thiocyanato)-2-thiazolyl]trifluoroacetamido]methyl-3-methoxyphenoxy Merrifield resin (XIX, 18.5 g) and dithiothreitol (12 g, 78 mmol) in tetrahydrofuran (100 mL) and methanol (100 mL) was agitated overnight. The resin was washed with dimethylformamide (2x), methanol (2x), dichloromethane (4x), and dried *in vacuo* and stored under argon at -20 °C.

20

F. Preparation of 4-N-[5-[[[(5-*t*-butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]trifluoroacetamido]methyl-3-methoxyphenoxy Merrifield resin (XXI)

A stream of argon was bubbled through a mixture 4-[[N-[(5-Mercapto)-2-thiazolyl]trifluoroacetamido]methyl-3-methoxyphenoxy Merrifield resin (XX, 500 mg), halide (2.0 mmol) and 1,8-diazabicyclo[5,4,0]undec-7-ene (DBU, 1.5 mmol) in dimethylformamide (3 mL) for 5 min., and the mixture was heated at 80 °C for 2 h. The resin was washed with dimethylformamide (2x), methanol (2x), dichloromethane (4x), and dried *in vacuo*.

30

G. Preparation of 4-N-[5-[[[(5-*t*-butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]methyl-3-methoxyphenoxy Merrifield resin (XXII)

A mixture of 4-N-[5-[[[(5-*t*-butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]trifluoroacetamido]methyl-3-methoxyphenoxy Merrifield resin (XXI, 500 mg) and sodium borohydride (4 mmol) in tetrahydrofuran (2 mL) and ethanol (2 mL) was agitated overnight. The resin was washed with 50% dimethylformamide in water (2x), dimethylformamide (2x), methanol (2x), dichloromethane (4x), and dried *in vacuo*.

10

H. Preparation of 4-N-[5-[[[(5-*t*-butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]trimethylacetamido]methyl-3-methoxyphenoxy Merrifield resin (XXIII)

A mixture of 4-N-[5-[[[(5-*t*-butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]methyl-3-methoxyphenoxy Merrifield resin (XXII, 100 mg), diisopropylethylamine (1.2 mmol) and trimethylacetyl chloride (1 mmol) in dichloromethane (2 mL) in a polypropylene tube fitted with a polyethylene frit and a luer stopcock was agitated overnight. The resin was washed with dimethylformamide (2x), methanol (2x), dichloromethane (4x), and used in the next step without drying.

20

I. Preparation of N-[5-[[[(5-*t*-butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]trimethylacetamide

4-N-[5-[[[(5-*t*-butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]trimethylacetamido]methyl-3-methoxyphenoxy Merrifield resin (XXIII) was treated with 60% trifluoroacetic acid in dichloromethane (2 mL) in a polypropylene tube fitted with a polyethylene frit and a luer stopcock for 4 hours. The solution was decanted to a tube and the resin was washed with dichloromethane. The combined organic solution was concentrated in Speed Vac. The residue was purified by preparative-HPLC to afford 11.3 mg of the desired product.

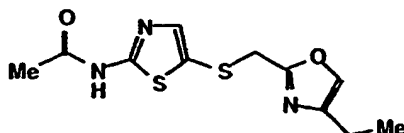
25
30

MS m/e 354 (M+H)⁺.

Example 6

N-[5-[[[(4-Ethyl-2-oxazolyl)methyl]thio]-2-thiazolyl]acetamide

5



A. Preparation of 2-(2-chloroacetamido)-1-butanol

To a mixture of 2-amino-1-butanol (5.0 mL, 53 mmol) and triethyl
10 amine (15.0 mL, 111 mmol) in dichloromethane (20 mL) at -70 °C was added
chloroacetyl chloride (4.6 mL, 58 mmol) dropwise. The reaction mixture was
stirred at -70 °C for 15 min. and then was allowed to warm to rt. It was
diluted with EtOAc (50 mL) and the reaction was quenched by adding water
(50 mL). The organic layer was separated and the aqueous layer was
15 extracted with EtOAc (3 x 30 mL). The combined organic layers was
concentrated to afford 2-(2-chloroacetamido)-1-butanol (8.6 g, 98%) as a
brown solid.

¹H NMR (CDCl₃) δ 6.75 (bs, 1 H), 4.10 (s, 2 H), 4.08(dd, 1H), 3.90 (m, 1 H),
3.68 (m, 2H), 2.98(bs, 1H), 1.60(m, 2H), 0.97 (t, 3H).

20

B. Preparation of 2-(2-chloroacetamido)-1-butyraldehyde

To a solution of oxalyl chloride (14.5 mL, 29.0 mmol) in
dichloromethane (30 mL) at -78 °C DMSO (2.75 mL, 38.8 mmol) was added
dropwise over 5 min.. After stirring for 10 min. at -78 °C, here was added a
25 solution of 2-(2-chloroacetamido)-1-butanol (4.0 g, 24 mmol) in 20 mL of
dichloromethane dropwise over 15 min. The reaction mixture was stirred for
40 min. at -78 °C and here was added triethyl amine (9.4 mL, 68 mmol)
dropwise over 5 min. and the reaction mixture was allowed to warm to room
temperature and stirred for 2 hrs. The solid was removed by filtration and

washed with EtOAc. The organic phase was washed with 1N HCl (2 x 100 mL), saturated aqueous NaHCO₃ (1 x 10 mL) and concentrated to afford 2-(2-chloroacetamido)-1-butyraldehyde (3.7 g, 95%) as a brown oil.

¹H NMR (CDCl₃) δ 9.60 (s, 1 H), 4.52 (q, 1 H), 4.12 (s, 2H), 2.05 (m, 1 H),
5 1.80 (m, 1H), 0.97 (t, 3H).

C. Preparation of 2-chloromethy-4-ethyloxazole

To a solution of 2-(2-chloroacetamido)-1-butyraldehyde (3.7 g, 23
10 mmol) in toluene (10 mL) was added POCl₃ (6.3 mL, 68 mmol). The reaction mixture was heated at 90 °C for 1 h under nitrogen. After cooling the reaction mixture to room temperature it was poured into ice water (10 mL) and the pH of the solution was adjusted to 7 with 5N NaOH. The toluene layer was separated and the aqueous layer was washed with
15 dichloromethane (3 x 20 mL). The combined organic solution was concentrated and distilled to afford 2-chloromethy-4-ethyloxazole (1.1g, 31%) as a colorless liquid.

¹H NMR (CDCl₃) δ 7.30 (s, 1H), 4.22 (s, 2 H), 2.50 (q, 2 H), 1.22 (t, 3H).

20 D. Preparation of N-[5-[[[4-ethyl-2-oxazolyl)methyl]thio]-2-thiazolyl]acetamide

To a solution of 2-acetylamino-5-thiazolylthiol (0.010 g, 0.050 mmol) in dry THF (5 mL) was added potassium *tert*-butoxide (1.0 M solution in THF, 0.060 mL, 0.060 mmol). The reaction mixture was stirred at room
25 temperature for 15 min. and here was added 2-chloromethyl-4-ethyloxazole (0.015 g, 0.10 mmol). After 3 h, saturated aqueous NaHCO₃ solution (5 mL) was added to the mixture. The organic layer was separated and the aqueous layer was washed with dichloromethane (3 x 10 mL). The combined organic layers was concentrated. The residue was
30 purified by flash chromatography (SiO₂; methanol:dichloromethane /1:20)

to afford N-[5-[[[4-ethyl-2-oxazolyl)methyl]thio]-2-thiazolyl]acetamide (5 mg, 36%) as a white solid.

^1H NMR (CDCl_3) δ 11.25 (s, 1 H), 7.34 (s, 1 H), 7.31(s, 1H), 3.95 (s, 2 H),

2.50 (q, 2H), 2.27(s, 3H), 1.19 (t, 3H); MS m/e 284 ($\text{M}+\text{H}^+$); HPLC

5 (Column: Zorbax Rapid resolution C-18; flow rate: 2.5 ml/min; solvent

system: 0-100% B in 8 min. Solvent A: 10% $\text{CH}_3\text{OH}/90\%$ $\text{H}_2\text{O}/0.2\%$

H_3PO_4 ; Solvent B: 90% $\text{CH}_3\text{OH}/10\%$ $\text{H}_2\text{O}/0.2\%$ H_3PO_4 ; UV: 254 nm):

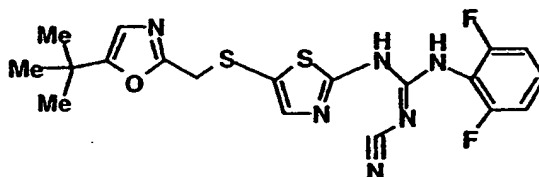
retention time 6.14 min.

10

Example 7

Preparation of N-[5-[[[5-*t*-Butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]- N' -cyano- N'' -(2,6-difluorophenyl)guanidine.

15



A solution of 100 mg of N-[5-[[[5-*t*-Butyl-2-oxazolyl)methyl]thio]-2-

aminothiazole and 68 mg of 2,6-difluorophenyl isothiocyanate was heated

20 at 65°C for 16 hours under argon. The solution was evaporated to dryness

and the residue purified by flash chromatography to give 91 mg of the intermediate thiourea.

To a solution of 30 mg of N-[5-[[[5-*t*-Butyl-2-oxazolyl)methyl]thio]-2-

thiazolyl]- N' -(2,6-difluorophenyl)thiourea, 52 mg of ethyl-3(3-

25 dimethylamino)propyl carbodiimide hydrochloride and 48 μL of

diisopropylethylamine in 0.5 mL methylene chloride was added a solution

of 29 mg of cyanamide in 0.1 mL tetrahydrofuran. After stirring for 1 hr,

the solvent was removed and the crude material purified by HPLC to give

8 mg of Example 636 compound.

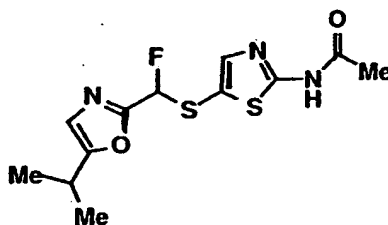
MS: (M+H)⁺ 449⁺

¹H NMR (400 MHz, CDCl₃): d 1.27 (9H, s), 4.19 (2H, s), 6.69 (1H, s), 7.03

5 (2H, m), 7.35 (1H, m), 8.74 (1H, s).

Example 8

10 Preparation of N-[5-[[[(5-isopropyl-2-oxazolyl)fluoromethyl]thio]-2-thiazolyl]acetamide.



To a stirred mixture of 2-acetamido-5-thiazole thiol acetate (141 mg) in 3
15 mL of dry THF under argon was added 1N t-BuOK in THF (0.72 mL).

This mixture was stirred at room temperature for 25 min, and a solution
of 5-isopropyl-(2-(chlorofluoromethyl))oxazole (116 mg) in 2 mL of dry THF
was added. The reaction mixture was stirred at 60° C for 18 hr, diluted
with 150 mL of EtOAc and washed with saturated NH₄Cl solution (2x25
20 mL), saturated NaHCO₃ solution (1x25 mL) and brine (1x25 mL). The
organic layer was dried (MgSO₄), filtered and concentrated *in vacuo* to
give Example 637 compound.

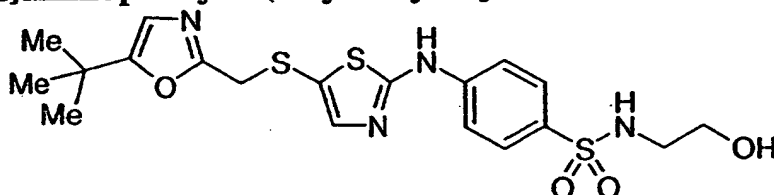
MS: (M+H)⁺ 316

HPLC retention time 3.52 min. (Column: YMC ODS S05 4.6 X 50 mm column, 0% to 100% B gradient in 4 min. Solvent A: 10% CH₃OH/90% H₂O/0.2% H₃PO₄; Solvent B: 90% CH₃OH/10% H₂O/0.2% H₃PO₄; UV: 220 nM).

5

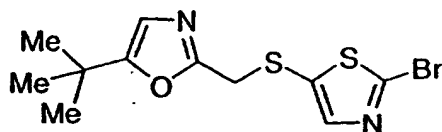
Example 9

Preparation of N-[5-[[[(5-t-butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]aminophenyl-4-(2-hydroxyethyl)sulfonamide



10

A. Preparation of 5-[[[(5-t-butyl-2-oxazolyl)methyl]thio]-2-bromothiazole.



15 To a solution of CuBr₂ (5.14 g in acetonitrile (100 mL) at 0° C was added tBuONO (4 mL, 1.2 eq) followed by 5-[[[(5-t-butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]amine (5.2 g). The mixture was stirred at 0° C for one hour, then at room temperature for one hour, ethyl acetate was added and the organic mixture washed with hydrochloric acid (2 X 50 mL), dried over

20 magnesium sulfate, filtered through a pad of silica gel, and concentrated in vacuo. The residue was chromatographed on silica gel to give the bromide as an orange oil (3.9 g).

MS: (M+H)⁺ 334

HPLC retention time 4.04 min. (Column: YMC ODS S05 4.6 X 50 mm

25 column, 0% to 100% B gradient in 4 min. Solvent A: 10% CH₃OH/90%

H₂O/0.2% H₃PO₄; Solvent B: 90% CH₃OH/10% H₂O/0.2% H₃PO₄; UV: 220
nM).

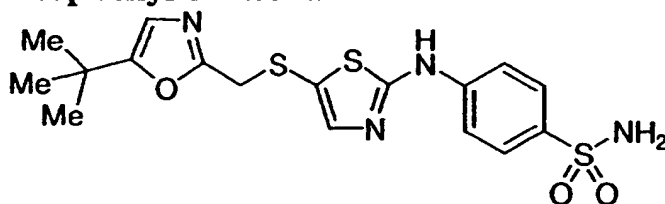
B. Preparation of N-[5-[[[(5-t-butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]aminophenyl-4-(2-hydroxyethyl)sulfonamide

- 5 A mixture of the 2-bromothiazole from Part A (0.85 g) in dimethyl acetamide (4 mL) and 4-aminophenyl-N-(2-hydroxyethyl)sulfonamide (2.5 g, 5 eq) was stirred at 145° C for 6 hours, cooled and ethyl acetate (80 mL) was added. The reaction mixture was washed with water (2 X 20 mL), the
10 combined aqueous solution was extracted with ethyl acetate, and the combined organic layers dried over sodium sulfate, evaporated in vacuo, and the residue was chromatographed on silica gel, then purified by reverse phase chromatography to give N-[5-[[[(5-t-butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]aminophenyl-4-(2-hydroxyethyl)sulfonamide as a
15 yellow solid (0.61 g).

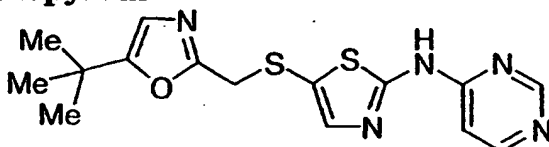
MS: (M+H)⁺ 469

HPLC retention time 3.80 min. (Column: YMC ODS S05 4.6 X 50 mm column, 0% to 100% B gradient in 4 min. Solvent A: 10% CH₃OH/90%

- H₂O/0.2% H₃PO₄; Solvent B: 90% CH₃OH/10% H₂O/0.2% H₃PO₄; UV: 220
20 nM).

Example 10**Preparation of N-[5-[[5-(tert-butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]aminophenyl-4-sulfonamide**

- 5 A mixture of the 2-bromothiazole from Example 9, Part A (106 mg) in dimethyl acetamide (0.5 mL) and 4-aminobenzenesulfonamide (275 mg, 5 eq) was stirred at 140° C for 6 hours, cooled and the solvent was removed under reduced pressure to provide a dark red oil which was purified by
- 10 preparative reverse phase HPLC (YMC S5 ODS) to give N-[5-[[5-(tert-butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]aminophenyl-4-sulfonamide (94 mg).
- MS: (M+H)+ 425
- HPLC retention time 3.74 min. (Column: YMC ODS S05 4.6 X 50 mm column, 0% to 100% B gradient in 4 min. Solvent A: 10% CH₃OH/90%
- 15 H₂O/0.2% H₃PO₄; Solvent B: 90% CH₃OH/10% H₂O/0.2% H₃PO₄; UV: 220 nM).

Example 11**Preparation of N-[5-[[5-(tert-butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]-4-aminopyrimidine**

- To a 50 mL single necked flask was added 4-aminopyrimidine (142 mg) in dry tetrahydrofuran (5 mL). A sodium hydride dispersion (60%, 60 mg)
- 25 was added, followed by heating to 60° C for one hour. The solution of the

anion was cooled to room temperature and the 2-bromothiazole from Example 9, Part A (100 mg) was added. The reaction was heated for 24 hours at 60° C, cooled to room temperature, quenched with hydrochloric acid and partitioned between water and ethyl acetate (25 mL each). The organic layer was washed with water (2 X 25 mL), brine (25 mL), dried over sodium sulfate and concentrated in vacuo to give a solid, which was purified by trituration with 1:1 ethyl acetate:hexanes to give N-[5-[(5-t-butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]-4-aminopyrimidine (42 mg).

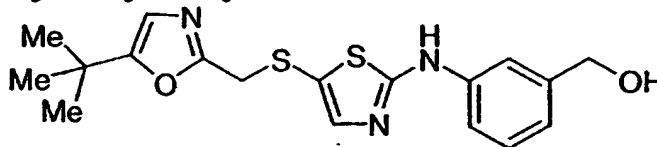
MS: (M+H)⁺ 348

HPLC retention time 3.63 min. (Column: YMC ODS S05 4.6 X 50 mm column, 0% to 100% B gradient in 4 min. Solvent A: 10% CH₃OH/90% H₂O/0.2% H₃PO₄; Solvent B: 90% CH₃OH/10% H₂O/0.2% H₃PO₄; UV: 220 nM).

15

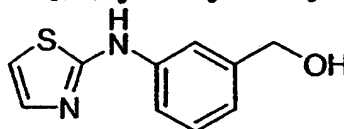
Example 12

Preparation of N-[5-[(5-t-butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]-3-(hydroxymethyl)aniline



20

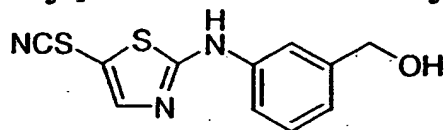
A. Preparation of N-2-[3-(hydroxymethyl)phenyl]aminothiazole



To a solution of 3-hydroxymethyl aniline (2.46 g) in dry tetrahydrofuran (50 mL) at -78° C was added methyl lithium-lithium bromide solution in ether (27 mL of 1.5 M solution). The reaction mixture was stirred at -78°

C for 10 minutes, warmed to room temperature for 10 minutes, and then cooled to -78°C and 2-bromothiazole (1.31 g) was added. The reaction mixture was stirred at 0°C for one hour, then at room temperature for 3 hours, quenched by addition of hydrochloric acid (20 mL of 2N solution),
5 concentrated and extracted with ethyl acetate. The combined organic extracts were dried over sodium sulfate, concentrated and chromatographed on silica gel to give N-2-[3-(hydroxymethyl)phenyl]aminothiazole (0.68 g).

10 **B. Preparation of N-2-[3-(hydroxymethyl)phenyl]aminothiazole-5-thiocyanate**



To a cooled solution(ice-salt bath) of the compound of part A (680 mg) and
15 ammonium thiocyanate (500 mg) in methanol (35 mL) was added portionwise bromine (0.21 mL). After disappearance of the bromine color the reaction was concentrated and partitioned between ethyl acetate and water. The aqueous layer was extracted with ethyl acetate and the combined organic extracts were dried over sodium sulfate, concentrated
20 and chromatographed on silica gel to give N-2-[3-(hydroxymethyl)phenyl]aminothiazole-5-thiocyanate as a yellow solid (490 mg).

C. Preparation of N-[5-[[5-(4-tert-butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]-3-(hydroxymethyl)aniline

25 To a dark red solution of the thiocyanate of part B (490 mg) in tetrahydrofuran/ethanol was added sodium borohydride portionwise (84

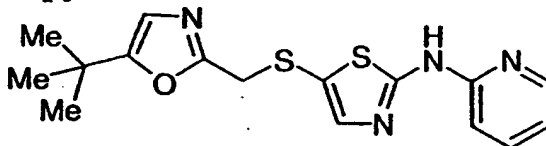
mg). After gas evolution had ceased, acetone (0.65 mL) was added the reaction stirred for 8 minutes, followed by addition of 2-chloromethyl-5-t-butyl-oxazole (Example 5, Part C compound, 0.5 g) and the reaction stirred for one hour at room temperature. The reaction was concentrated, extracted with ethyl acetate, the combined organic extracts dried over sodium sulfate, and filtered through a pad of silica gel to provide the product (0.69 g).

MS: (M+H)⁺ 376

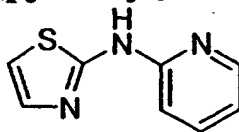
HPLC retention time 3.84 min. (Column: YMC ODS S05 4.6 X 50 mm column, 0% to 100% B gradient in 4 min. Solvent A: 10% CH₃OH/90% H₂O/0.2% H₃PO₄; Solvent B: 90% CH₃OH/10% H₂O/0.2% H₃PO₄; UV: 220 nM).

Example 13

15 Preparation of N-[5-[[[(5-t-butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]-2-aminopyridine



A. Preparation of N-2-[pyridinyl]aminothiazole



20

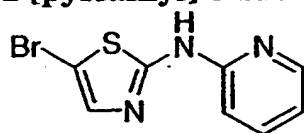
To a suspension of sodium hydride (60% suspension, 1.8 g) in tetrahydrofuran (200 mL) was added portionwise 2-aminopyridine (4.23 g), and the mixture was slowly heated to 55° C for 30 minutes. The reaction mixture was then cooled to -10 deg C and a solution of 2-

bromothiazole (2.46 g) in tetrahydrofuran (2 mL) was added dropwise.

The reaction mixture was stirred at 55° C for 5 hours, cooled and quenched with hydrochloric acid (2N, 20 mL), concentrated, and ethyl acetate was added. The resulting solid was filtered to give N-2-

5 [pyridinyl]aminothiazole (1.41 g).

B. Preparation of N-2-[pyridinyl]-5-bromo-aminothiazole



To a solution of the compound of Part A(0.88 g) in acetic acid(15 mL) was
10 added bromine (0.22 mL in 2 mL acetic acid) dropwise at room
temperature. The reaction mixture was stirred at room temperature for 2
hours, the was solvent removed under reduced pressure, and the resulting
solid was triturated with ether to provide N-2-[pyridinyl]-5-bromo-
aminothiazole (1.6 g) as the hydrobromide salt.

15

C. Preparation of N-[5-[[5-t-butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]-2-aminopyridine

To a solution of N-2-[pyridinyl]-5-bromo-aminothiazole (8 g) and 2-
20 thioacetyl-5-t-butyl oxazole (8 g) in methanol (500 mL) under argon was
added a degassed solution of sodium hydroxide (25 mL of 3 N solution) at
room temperature. The reaction mixture was stirred for 20 minutes and
then heated to 60° C for one hour, concentrated in vacuo, partitioned
between water (125 mL) and ethyl acetate (500 mL) and the aqueous layer
25 was back-extracted (2 X 125 mL) with ethyl acetate. The combined
organic layers were washed with brine (25 mL) , dried over sodium

sulfate, filtered through a pad of silica gel, and the solvents removed in vacuo. The solid residue was recrystallized from ethyl acetate to provide N-[5-[[[(5-t-butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]-2-aminopyridine (7.5 g).

5 MS: (M+H)⁺ 347

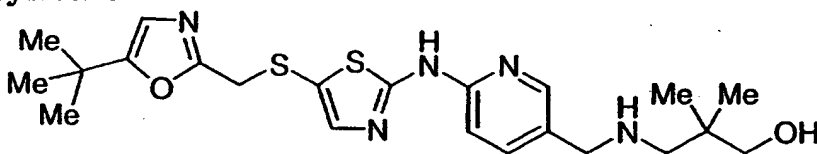
HPLC retention time 4.01 min. (Column: YMC ODS S05 4.6 X 50 mm column, 0% to 100% B gradient in 4 min. Solvent A: 10% CH₃OH/90% H₂O/0.2% H₃PO₄; Solvent B: 90% CH₃OH/10% H₂O/0.2% H₃PO₄; UV: 220 nM).

10

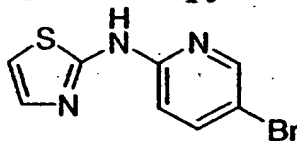
Example 14

Preparation of N-[5-[[[(5-t-butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]-2-[5-[[[(3-hydroxy-2,2-dimethyl)propyl)amino)methyl]]aminopyridine

15



A. Preparation of N-2-[(5-bromo)pyridinyl]aminothiazole

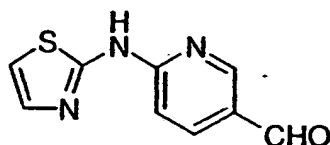


20 To a suspension of sodium hydride (60% suspension, 5.2 g) in tetrahydrofuran (150 mL) was added portionwise 2-amino-4-bromopyridine (15 g), and the mixture was stirred at room temperature for 15 minutes. 2-Bromothiazole (3.8 mL) was added, and the reaction mixture was stirred at room temperature for one hour and then heated at

25 reflux temperature for 2.5 hours, cooled, quenched with 6% citric acid and

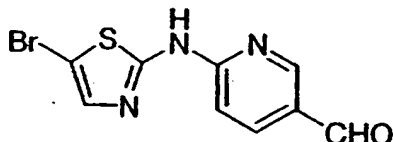
extracted with ethyl acetate (2 X 100 mL). The organic layers were concentrated, dried over magnesium sulfate and the filtrate concentrated in vacuo to give a dark brown residue which was triturated with ether/hexanes to provide N-2-[(5-bromo)pyridinyl]aminothiazole as a
5 yellow solid (8.9 g)

B. Preparation of N-2-[(5-carboxaldehyde)pyridinyl]aminothiazole



10 A suspension of the Part A compound (6.4 g) in tetrahydrofuran (300 mL) was heated to reflux to effect dissolution, the reaction mixture was cooled to -70°C and treated with *t*-BuMgCl (13 mL of 2M solution in ether) dropwise over 10 minutes. The temperature was raised to -55°C , and *t*-BuLi (36 mL of 1.7 M solution in hexanes) was added dropwise, and the
15 reaction mixture stirred for 20 minutes. The reaction mixture was then cooled to -70°C and DMF (8 mL) was added, the resulting mixture was stirred at -50°C for one hour and then warmed to 0°C over one hour, quenched with acetic acid (8 mL) and partitioned between ethyl acetate and water (300 mL each). The aqueous layer was back extracted with
20 ethyl acetate (2 X 200 mL) and the combined organic layers dried over magnesium sulfate and concentrated, the solid washed with ethyl acetate and ether, and dried to give N-2-[(5-carboxaldehyde) pyridinyl]aminothiazole (3.15 g).

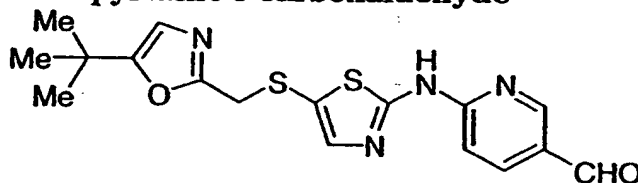
C. Preparation of N-2-[(5-carboxaldehyde)pyridinyl]-5-bromo-aminothiazole



A solution of N-2-[(5-carboxaldehyde)pyridinyl] aminothiazole (0.5 g) in
 5 acetic acid (6 mL) and dichloromethane (20 mL) was treated with bromine
 (0.12 mL) in dichloromethane (3 mL). The reaction mixture was stirred
 for 30 minutes at room temperature, ether was added, and the resulting
 precipitate was collected by filtration, washed with ether to give N-2-[(5-
 carboxaldehyde)pyridinyl]-5-bromo-aminothiazole (0.69 g).

10

D. Preparation of N-[5-[(5-t-butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]-2-aminopyridine-5-carboxaldehyde



To a solution of the compound of Part C (3.8 g) and 5-t-butyl-2-(S-
 15 isothioureia)methyl oxazole (3.06 g) in methanol (300 mL) under nitrogen
 was added degassed sodium hydroxide (6.4 g of 50% w/w solution). The
 reaction mixture was heated at 76° C for 6 hours, the methanol was
 removed in vacuo, water was added, and the solid was collected by
 filtration, washed with water and ethyl acetate, and dried to give N-[5-
 20 [(5-t-butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]-2-aminopyridine-5-
 carboxaldehyde (0.53 g). The filtrate was extracted with ethyl acetate (4 X
 200 mL), dried over magnesium sulfate, and concentrated in vacuo and

trituated with ether/ethyl acetate to give an additional 2.02 g of the desired compound.

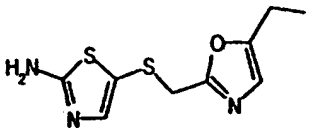
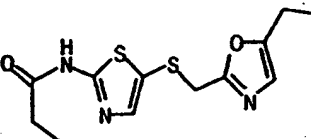
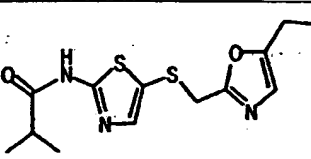
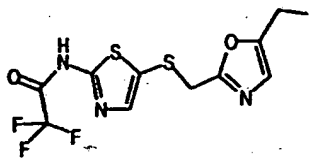
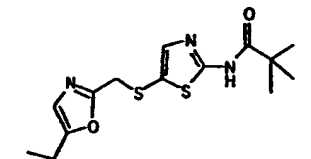
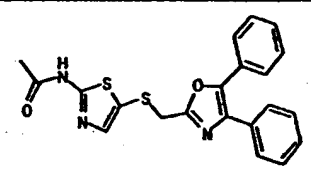
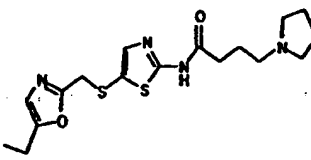
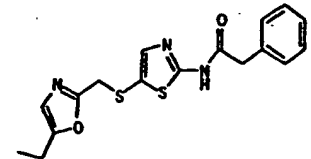
E. Preparation of N-[5-[(5-t-butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]-2-[5-[(3-hydroxy-2,2-dimethyl)propyl)amino)methyl]] aminopyridine

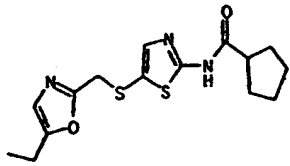
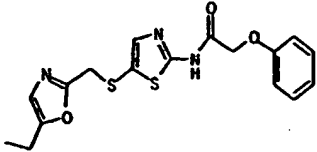
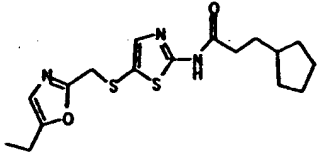
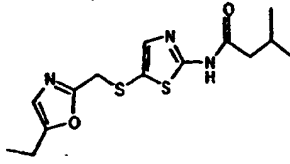
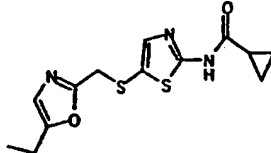
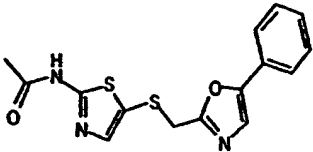
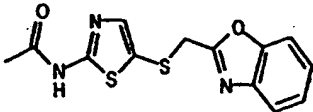
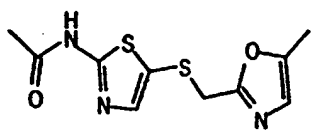
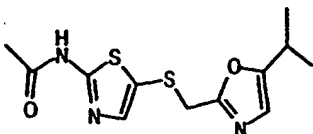
To a solution of the aldehyde of Part D (1.5 g) and 3-amino-2,2-dimethyl propanol (2.06 g) in tetrahydrofuran (100 mL) was added sodium triacetoxyborohydride (6.0 g), followed by acetic acid (5 mL). The reaction mixture was stirred for 30 minutes at room temperature, and the solvents removed in vacuo to give a yellow solid which was purified by column chromatography to give N-[5-[(5-t-butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]-2-[5-[(3-hydroxy-2,2-dimethyl)propyl)amino)methyl]] aminopyridine (1.08 g).

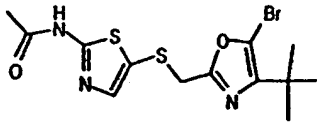
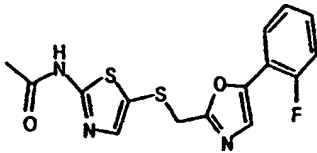
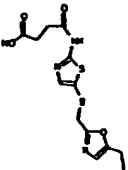
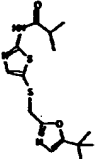
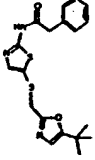
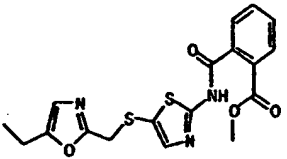
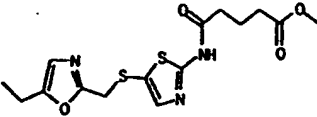
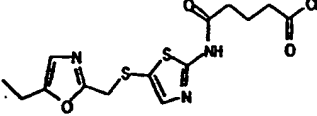
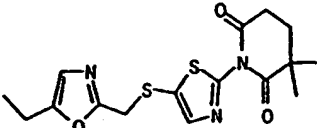
MS: (M+H)⁺ 462

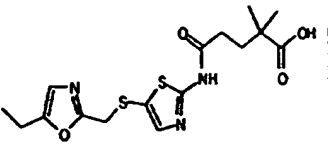
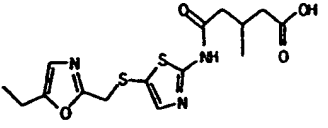
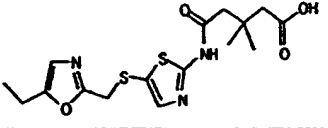
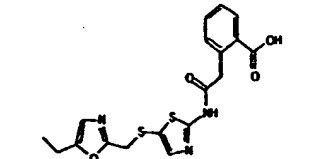
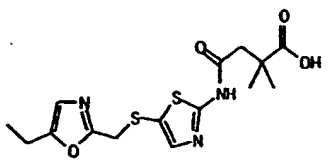
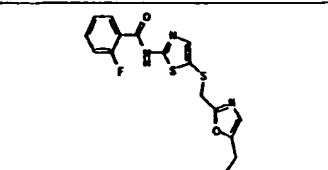
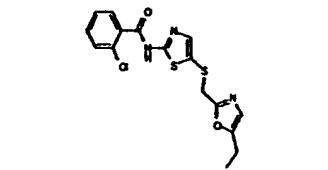
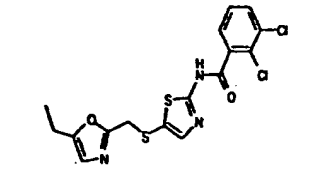
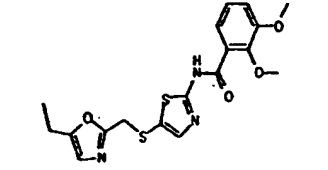
HPLC retention time 3.22 min. (Column: YMC ODS S05 4.6 X 50 mm column, 0% to 100% B gradient in 4 min. Solvent A: 10% CH₃OH/90% H₂O/0.2% H₃PO₄; Solvent B: 90% CH₃OH/10% H₂O/0.2% H₃PO₄; UV: 220 nM).

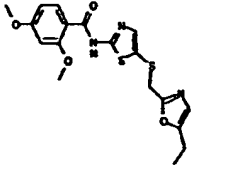
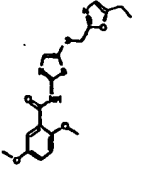
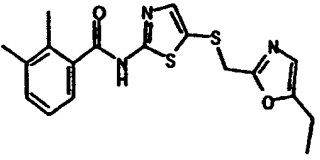
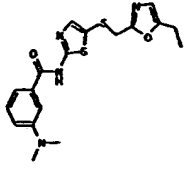
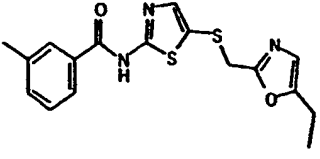
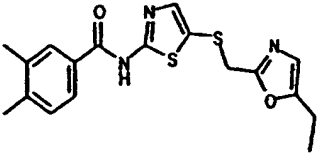
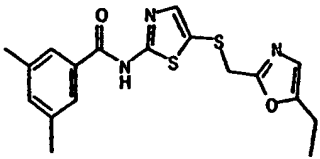
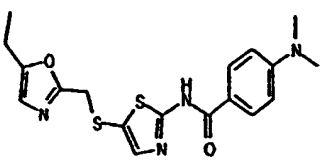
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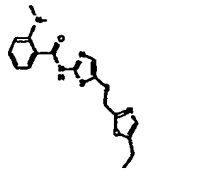
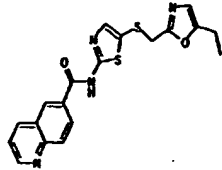
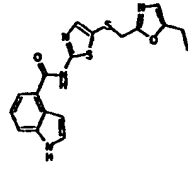
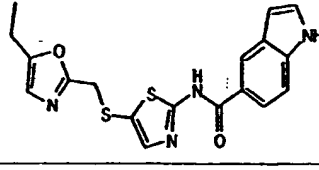
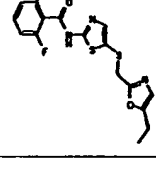
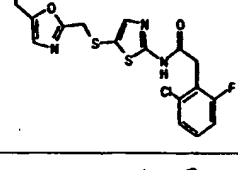
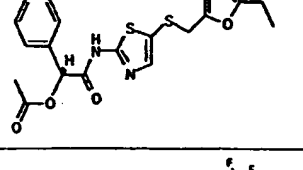
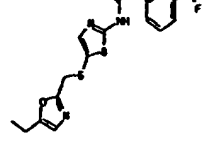
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17		C ₁₃ H ₁₇ N ₃ O ₂ S ₂	312
18		C ₁₁ H ₁₀ F ₃ N ₃ O ₂ S ₂	338
19		C ₁₄ H ₁₉ N ₃ O ₂ S ₂	326
20		C ₂₁ H ₁₇ N ₃ O ₂ S ₂	408
21		C ₁₇ H ₂₄ N ₄ O ₂ S ₂	381
22		C ₁₇ H ₁₇ N ₃ O ₂ S ₂	360

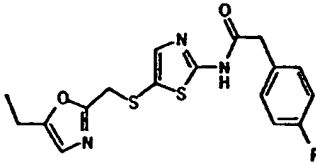
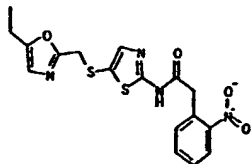
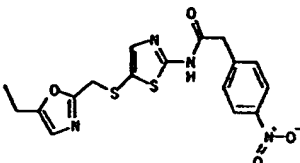
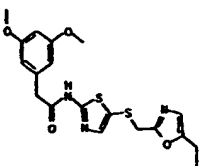
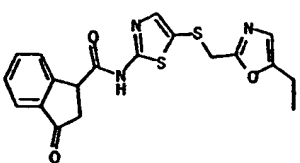
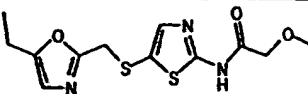
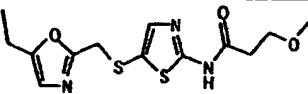
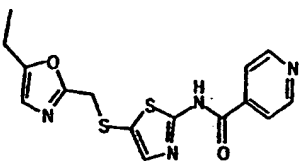
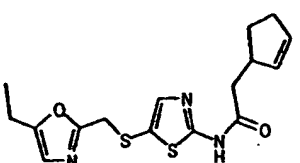
Example	Structure	Molecular Formula	(M+H) ⁺
23		C ₁₅ H ₁₉ N ₃ O ₂ S ₂	338
24		C ₁₇ H ₁₇ N ₃ O ₃ S ₂	376
25		C ₁₇ H ₂₃ N ₃ O ₂ S ₂	366
26		C ₁₄ H ₁₉ N ₃ O ₂ S ₂	326
27		C ₁₃ H ₁₅ N ₃ O ₂ S ₂	310
28		C ₁₅ H ₁₃ N ₃ O ₂ S ₂	332
29		C ₁₃ H ₁₁ N ₃ O ₂ S ₂	306
30		C ₁₀ H ₁₁ N ₃ O ₂ S ₂	270
31		C ₁₂ H ₁₅ N ₃ O ₂ S ₂	298

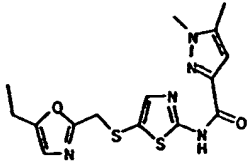
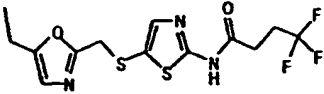
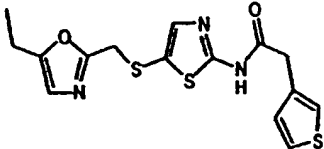
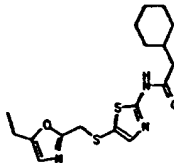
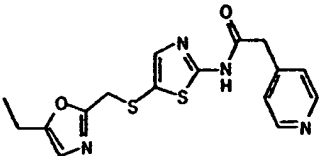
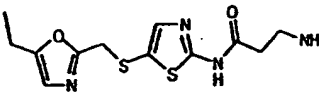
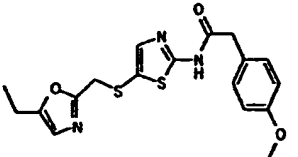
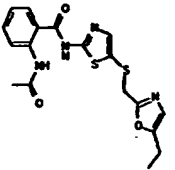
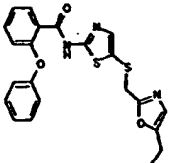
Example	Structure	Molecular Formula	(M+H) ⁺
32		C ₁₃ H ₁₆ BrN ₃ O ₂ S ₂	391
33		C ₁₅ H ₁₂ FN ₃ O ₂ S ₂	350
34		C ₁₃ H ₁₅ N ₃ O ₄ S ₂	342
35		C ₁₅ H ₂₁ N ₃ O ₂ S ₂	340
36		C ₁₉ H ₂₁ N ₃ O ₂ S ₂	388
37		C ₁₈ H ₁₇ N ₃ O ₄ S ₂	404
38		C ₁₅ H ₁₉ N ₃ O ₄ S ₂	370
39		C ₁₄ H ₁₇ N ₃ O ₄ S ₂	356
40		C ₁₆ H ₁₉ N ₃ O ₃ S ₂	366

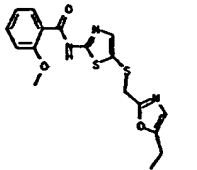
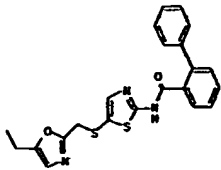
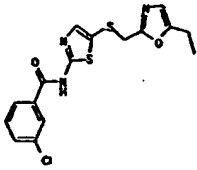
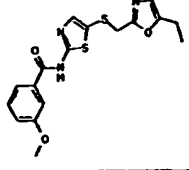
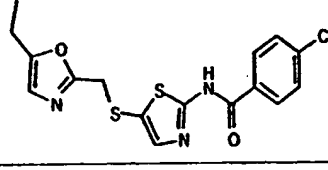
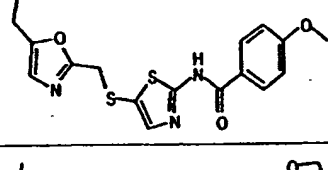
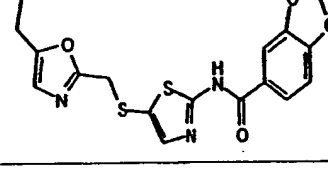
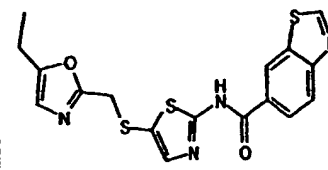
Example	Structure	Molecular Formula	(M+H) ⁺
41		C ₁₆ H ₂₁ N ₃ O ₄ S ₂	384
42		C ₁₅ H ₁₉ N ₃ O ₄ S ₂	370
43		C ₁₆ H ₂₁ N ₃ O ₄ S ₂	384
44		C ₁₈ H ₁₇ N ₃ O ₄ S ₂	404
45		C ₁₅ H ₁₉ N ₃ O ₄ S ₂	370
46		C ₁₆ H ₁₄ FN ₃ O ₂ S ₂	364
47		C ₁₆ H ₁₄ ClN ₃ O ₂ S ₂	380
48		C ₁₆ H ₁₃ Cl ₂ N ₃ O ₂ S ₂	415
49		C ₁₈ H ₁₉ N ₃ O ₄ S ₂	406

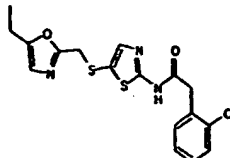
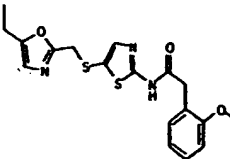
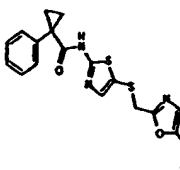
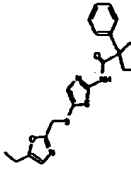
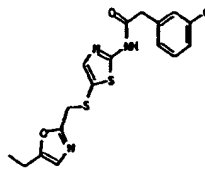
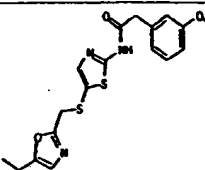
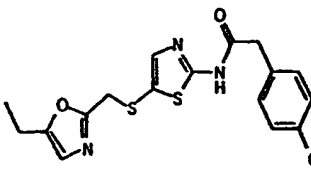
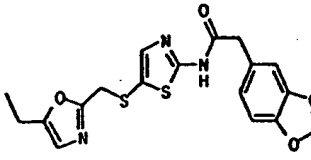
Example	Structure	Molecular Formula	(M+H) ⁺
50		C ₁₈ H ₁₉ N ₃ O ₄ S ₂	406
51		C ₁₈ H ₁₉ N ₃ O ₄ S ₂	406
52		C ₁₈ H ₁₉ N ₃ O ₂ S ₂	374
53		C ₁₈ H ₂₀ N ₄ O ₂ S ₂	503
54		C ₁₇ H ₁₇ N ₃ O ₂ S ₂	360
55		C ₁₈ H ₁₉ N ₃ O ₂ S ₂	374
56		C ₁₈ H ₁₉ N ₃ O ₂ S ₂	374
57		C ₁₈ H ₂₀ N ₄ O ₂ S ₂	503

Example	Structure	Molecular Formula	(M+H) ⁺
58		C ₁₈ H ₂₀ N ₄ O ₂ S ₂	503
59		C ₁₉ H ₁₆ N ₄ O ₂ S ₂	511
60		C ₁₈ H ₁₆ N ₄ O ₂ S ₂	499
61		C ₁₈ H ₁₆ N ₄ O ₂ S ₂	499
62		C ₁₆ H ₁₃ F ₂ N ₃ O ₂ S ₂	382
63		C ₁₇ H ₁₅ Cl F N ₃ O ₂ S ₂	412
64		C ₁₉ H ₁₉ N ₃ O ₄ S ₂	418
65		C ₁₈ H ₁₆ F ₃ N ₃ O ₂ S ₂	428

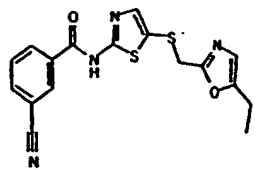
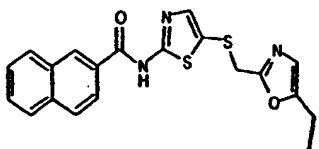
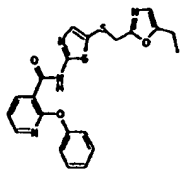
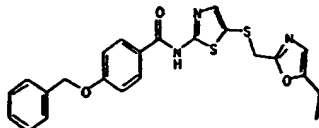
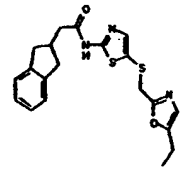
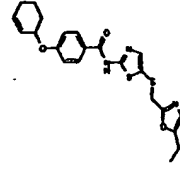
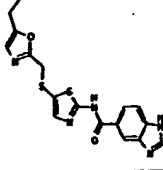
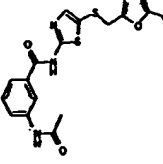
Example	Structure	Molecular Formula	(M+H) ⁺
66		C ₁₇ H ₁₆ F N ₃ O ₂ S ₂	378
67		C ₁₇ H ₁₆ N ₄ O ₄ S ₂	405
68		C ₁₇ H ₁₆ N ₄ O ₄ S ₂	405
69		C ₁₉ H ₂₁ N ₃ O ₄ S ₂	420
70		C ₁₉ H ₁₇ N ₃ O ₃ S ₂	400
71		C ₁₂ H ₁₅ N ₃ O ₃ S ₂	314
72		C ₁₃ H ₁₇ N ₃ O ₃ S ₂	328
73		C ₁₅ H ₁₄ N ₄ O ₂ S ₂	461
74		C ₁₆ H ₁₉ N ₃ O ₂ S ₂	350

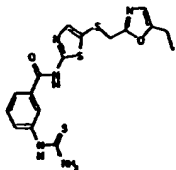
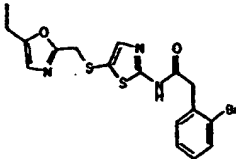
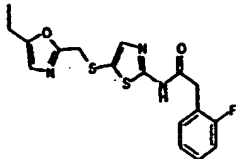
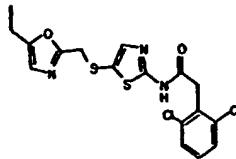
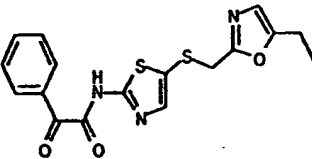
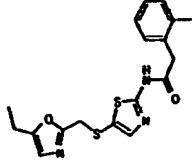
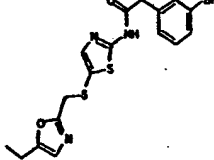
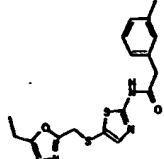
Example	Structure	Molecular Formula	(M+H) ⁺
75		C ₁₅ H ₁₇ N ₅ O ₂ S ₂	364
76		C ₁₃ H ₁₄ F ₃ N ₃ O ₂ S ₂	366
77		C ₁₅ H ₁₅ N ₃ O ₂ S ₃	366
78		C ₁₇ H ₂₃ N ₃ O ₂ S ₂	366
79		C ₁₆ H ₁₆ N ₄ O ₂ S ₂	475
80		C ₁₂ H ₁₆ N ₄ O ₂ S ₂	427
81		C ₁₈ H ₁₉ N ₃ O ₃ S ₂	390
82		C ₁₈ H ₁₈ N ₄ O ₃ S ₂	403
83		C ₂₂ H ₁₉ N ₃ O ₃ S ₂	438

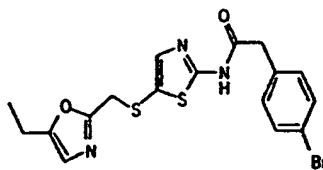
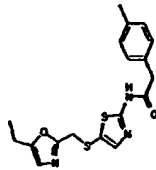
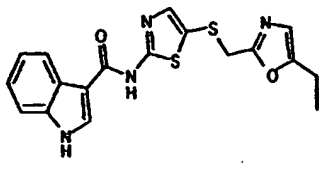
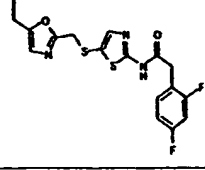
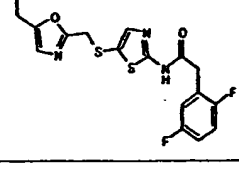
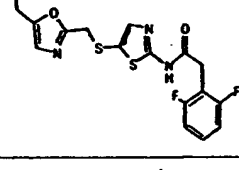
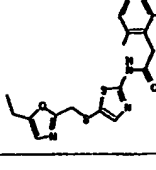
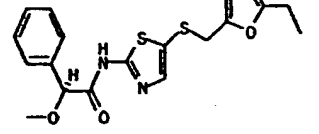
Example	Structure	Molecular Formula	(M+H)+
84		C ₁₇ H ₁₇ N ₃ O ₃ S ₂	376
85		C ₂₂ H ₁₉ N ₃ O ₂ S ₂	422
86		C ₁₆ H ₁₄ Cl N ₃ O ₂ S ₂	380
87		C ₁₇ H ₁₇ N ₃ O ₃ S ₂	376
88		C ₁₆ H ₁₄ Cl N ₃ O ₂ S ₂	380
89		C ₁₇ H ₁₇ N ₃ O ₃ S ₂	376
90		C ₁₇ H ₁₅ N ₃ O ₄ S ₂	390
91		C ₁₇ H ₁₄ N ₄ O ₂ S ₃	403

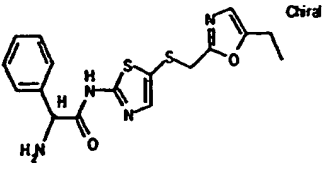
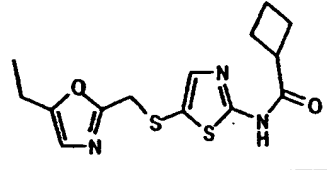
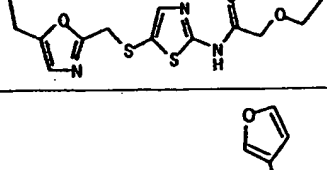
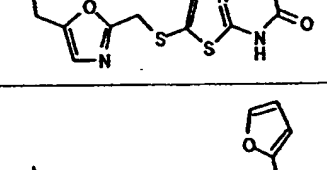
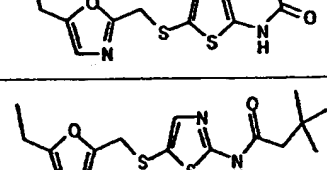
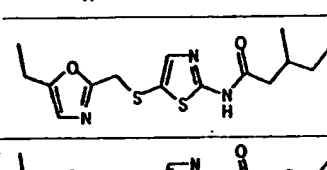
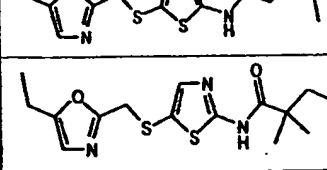
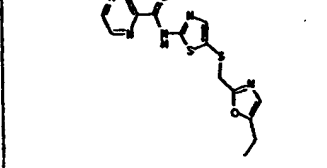


Example	Structure	Molecular Formula	(M+H) ⁺
92		C ₁₇ H ₁₆ Cl N ₃ O ₂ S ₂	394
93		C ₁₈ H ₁₉ N ₃ O ₃ S ₂	390
94		C ₁₉ H ₁₉ N ₃ O ₂ S ₂	386
95		C ₂₁ H ₂₃ N ₃ O ₂ S ₂	414
96		C ₁₇ H ₁₆ Cl N ₃ O ₂ S ₂	394
97		C ₁₈ H ₁₉ N ₃ O ₃ S ₂	390
98		C ₁₇ H ₁₆ Cl N ₃ O ₂ S ₂	394
99		C ₁₈ H ₁₇ N ₃ O ₄ S ₂	404

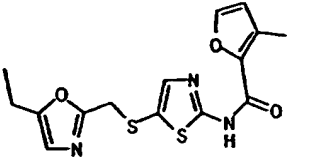
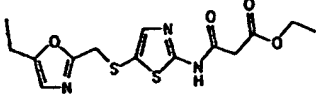
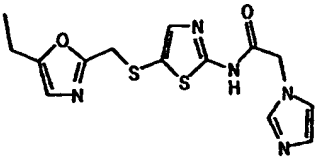
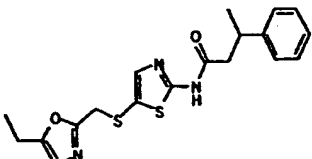
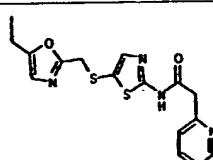
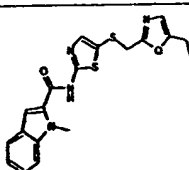
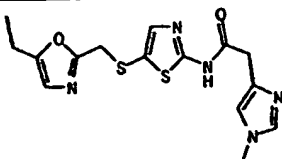
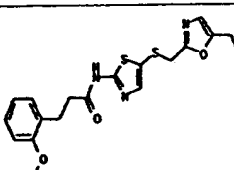
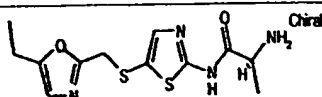
Example	Structure	Molecular Formula	(M+H)+
100		C ₂₅ H ₂₂ N ₄ O ₂ S ₂	589
101		C ₁₄ H ₁₇ N ₃ O ₃ S ₂	340
102		C ₁₄ H ₁₇ N ₃ O ₃ S ₂	340
103		C ₁₅ H ₁₄ N ₄ O ₂ S ₂	461
104		C ₁₆ H ₂₁ N ₃ O ₂ S ₂	352
105		C ₁₈ H ₁₇ N ₃ O ₃ S ₂	388
106		C ₁₆ H ₁₆ N ₄ O ₂ S ₂	475
107		C ₁₉ H ₁₈ N ₄ O ₂ S ₂	513

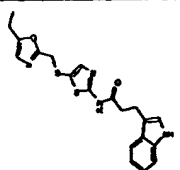
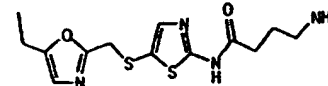
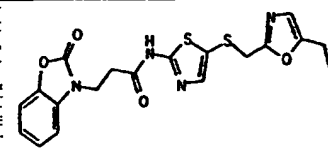
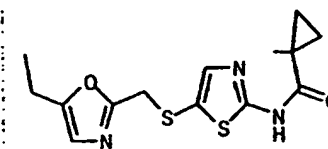
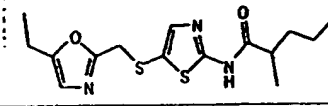
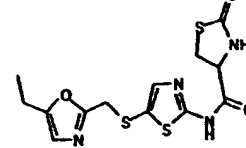
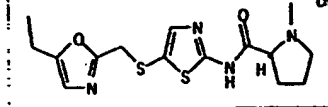
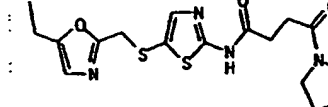
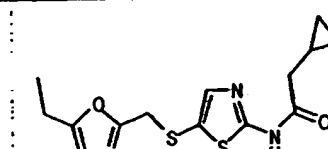
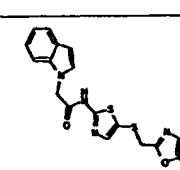
Example	Structure	Molecular Formula	(M+H) ⁺
108		C ₁₇ H ₁₄ N ₄ O ₂ S ₂	371
109		C ₂₀ H ₁₇ N ₃ O ₂ S ₂	396
110		C ₂₁ H ₁₈ N ₄ O ₃ S ₂	553
111		C ₂₃ H ₂₁ N ₃ O ₃ S ₂	452
112		C ₂₀ H ₂₁ N ₃ O ₂ S ₂	400
113		C ₂₂ H ₂₃ N ₃ O ₃ S ₂	442
114		C ₁₇ H ₁₅ N ₅ O ₂ S ₂	500
115		C ₁₈ H ₁₈ N ₄ O ₃ S ₂	403

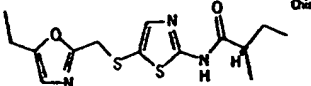
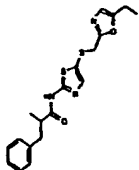
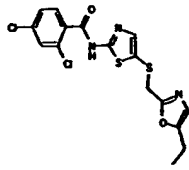
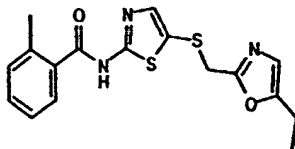
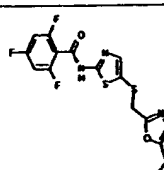
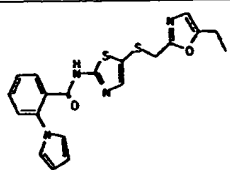
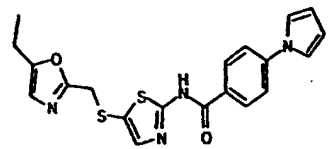
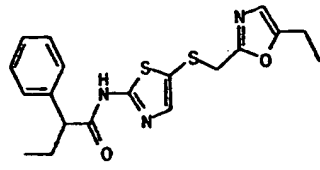
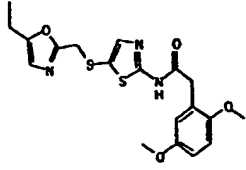
Example	Structure	Molecular Formula	(M+H) ⁺
116		C ₁₇ H ₁₇ N ₅ O ₂ S ₃	420
117		C ₁₇ H ₁₆ Br N ₃ O ₂ S ₂	439
118		C ₁₇ H ₁₆ F N ₃ O ₂ S ₂	378
119		C ₁₇ H ₁₅ Cl ₂ N ₃ O ₂ S ₂	429
120		C ₁₇ H ₁₅ N ₃ O ₃ S ₂	374
121		C ₁₈ H ₁₉ N ₃ O ₂ S ₂	374
122		C ₁₇ H ₁₆ Br N ₃ O ₂ S ₂	439
123		C ₁₈ H ₁₉ N ₃ O ₂ S ₂	374

Example	Structure	Molecular Formula	(M+H) ⁺
124		C ₁₇ H ₁₆ Br N ₃ O ₂ S ₂	439
125		C ₁₈ H ₁₉ N ₃ O ₂ S ₂	374
126		C ₁₈ H ₁₆ N ₄ O ₂ S ₂	499
127		C ₁₇ H ₁₅ F ₂ N ₃ O ₂ S ₂	396
128		C ₁₇ H ₁₅ F ₂ N ₃ O ₂ S ₂	396
129		C ₁₇ H ₁₅ F ₂ N ₃ O ₂ S ₂	396
130		C ₂₀ H ₂₃ N ₃ O ₂ S ₂	402
131		C ₁₈ H ₁₉ N ₃ O ₃ S ₂	390

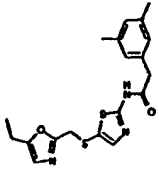
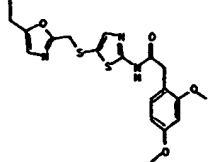
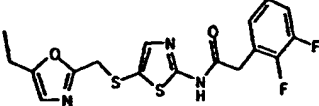
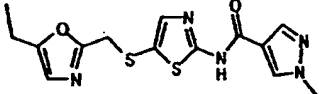
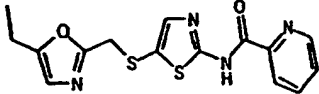
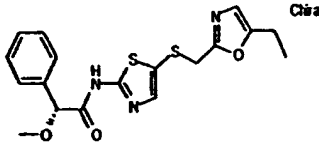
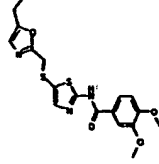
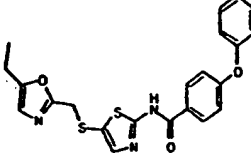
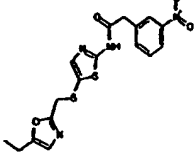
Example	Structure	Molecular Formula	(M+H)+
132		C ₁₇ H ₁₈ N ₄ O ₂ S ₂	489
133		C ₁₄ H ₁₇ N ₃ O ₂ S ₂	324
134		C ₁₃ H ₁₇ N ₃ O ₃ S ₂	328
135		C ₁₄ H ₁₃ N ₃ O ₃ S ₂	336
136		C ₁₄ H ₁₃ N ₃ O ₃ S ₂	336
137		C ₁₅ H ₂₁ N ₃ O ₂ S ₂	340
138		C ₁₅ H ₂₁ N ₃ O ₂ S ₂	340
139		C ₁₅ H ₂₁ N ₃ O ₂ S ₂	340
140		C ₁₅ H ₂₁ N ₃ O ₂ S ₂	340
141		C ₁₄ H ₁₃ N ₅ O ₂ S ₂	348

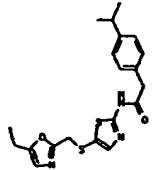
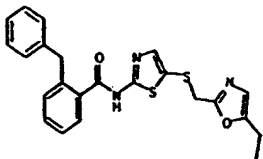
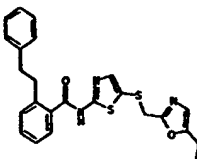
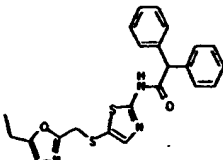
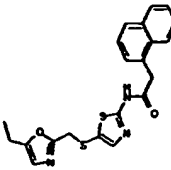
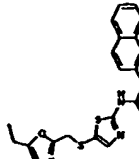
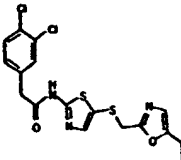
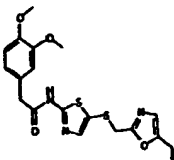
Example	Structure	Molecular Formula	(M+H)+
142		C ₁₅ H ₁₅ N ₃ O ₃ S ₂	350
143		C ₁₄ H ₁₇ N ₃ O ₄ S ₂	356
144		C ₁₄ H ₁₅ N ₅ O ₂ S ₂	464
145		C ₁₉ H ₂₁ N ₃ O ₂ S ₂	388
146		C ₁₆ H ₁₆ N ₄ O ₂ S ₂	475
147		C ₁₉ H ₁₈ N ₄ O ₂ S ₂	513
148		C ₁₅ H ₁₇ N ₅ O ₂ S ₂	478
149		C ₁₉ H ₂₁ N ₃ O ₃ S ₂	404
150		C ₁₂ H ₁₆ N ₄ O ₂ S ₂	427

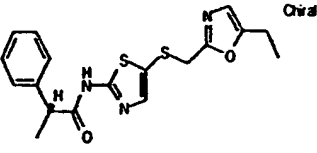
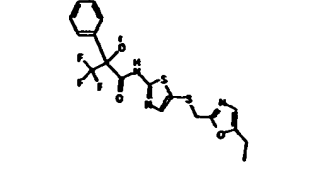
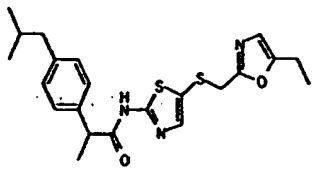
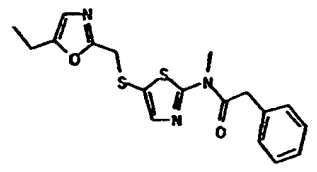
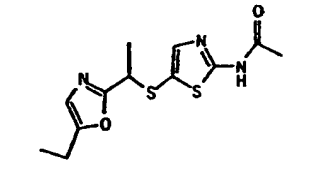
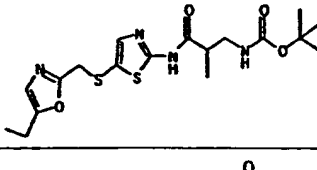
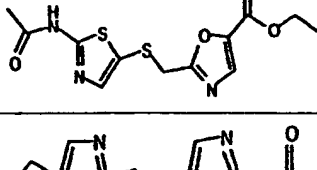
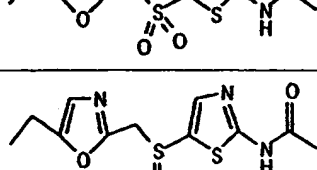

Example	Structure	Molecular Formula	(M+H)+
151		C ₂₀ H ₂₀ N ₄ O ₂ S ₂	527
152		C ₁₃ H ₁₈ N ₄ O ₂ S ₂	441
153		C ₁₉ H ₁₈ N ₄ O ₄ S ₂	431
154		C ₁₄ H ₁₇ N ₃ O ₂ S ₂	324
155		C ₁₅ H ₂₁ N ₃ O ₂ S ₂	340
156		C ₁₃ H ₁₄ N ₄ O ₃ S ₃	371
157		C ₁₅ H ₂₀ N ₄ O ₂ S ₂	467
158		C ₁₇ H ₂₂ N ₄ O ₃ S ₂	395
159		C ₁₄ H ₁₇ N ₃ O ₂ S ₂	324
160		C ₁₉ H ₁₈ N ₄ O ₂ S ₂	513

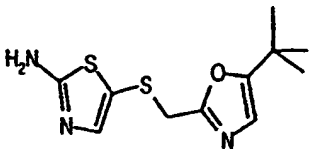
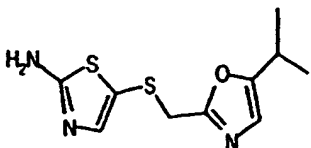
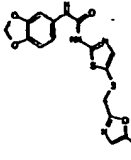
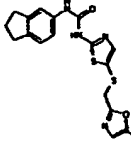
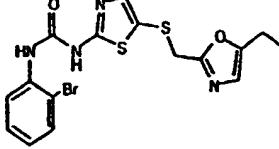
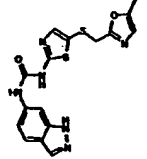
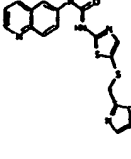
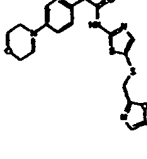
Example	Structure	Molecular Formula	(M+H)+
161		C ₁₄ H ₁₉ N ₃ O ₂ S ₂	326
162		C ₁₉ H ₂₁ N ₃ O ₂ S ₂	388
163		C ₁₆ H ₁₃ Cl ₂ N ₃ O ₂ S ₂	415
164		C ₁₇ H ₁₇ N ₃ O ₂ S ₂	360
165		C ₁₆ H ₁₂ F ₃ N ₃ O ₂ S ₂	400
166		C ₂₀ H ₁₈ N ₄ O ₂ S ₂	525
167		C ₂₀ H ₁₈ N ₄ O ₂ S ₂	525
168		C ₁₉ H ₂₁ N ₃ O ₂ S ₂	388
169		C ₁₉ H ₂₁ N ₃ O ₄ S ₂	420

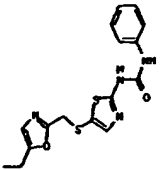
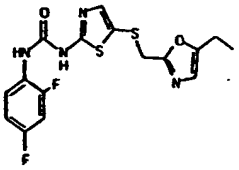
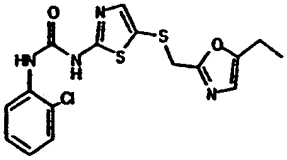
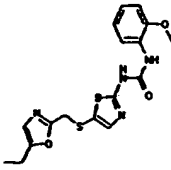
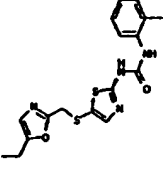
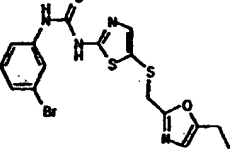
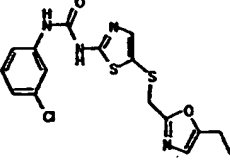
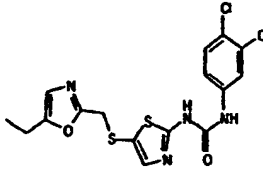
Example	Structure	Molecular Formula	(M+H) ⁺
170		C ₁₇ H ₁₆ F N ₃ O ₂ S ₂	378
171		C ₂₀ H ₂₃ N ₃ O ₅ S ₂	450
172		C ₁₈ H ₁₆ F ₃ N ₃ O ₂ S ₂	428
173		C ₁₉ H ₂₁ N ₃ O ₂ S ₂	388
174		C ₁₉ H ₂₁ N ₃ O ₂ S ₂	388
175		C ₁₈ H ₁₉ N ₃ O ₂ S ₂	374
176		C ₁₇ H ₁₇ N ₃ O ₃ S ₂	376
177		C ₁₉ H ₂₂ N ₄ O ₂ S ₂	517

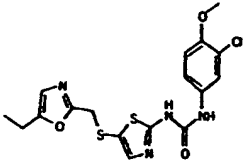
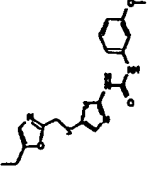
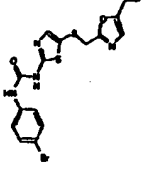
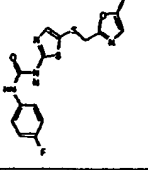
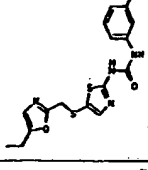
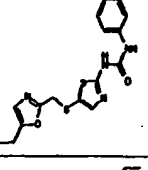
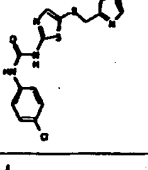
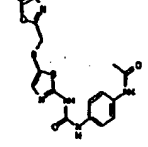
Example	Structure	Molecular Formula	(M+H) ⁺
178		C ₁₉ H ₂₁ N ₃ O ₂ S ₂	388
179		C ₁₉ H ₂₁ N ₃ O ₄ S ₂	420
180		C ₁₇ H ₁₅ F ₂ N ₃ O ₂ S ₂	396
181		C ₁₄ H ₁₅ N ₅ O ₂ S ₂	350
182		C ₁₅ H ₁₄ N ₄ O ₂ S ₂	461
183		C ₁₈ H ₁₉ N ₃ O ₃ S ₂	390
184		C ₁₈ H ₁₉ N ₃ O ₄ S ₂	406
185		C ₂₂ H ₁₉ N ₃ O ₃ S ₂	438
186		C ₁₇ H ₁₆ N ₄ O ₄ S ₂	405

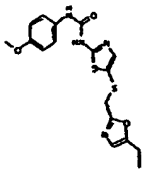
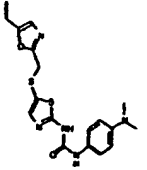
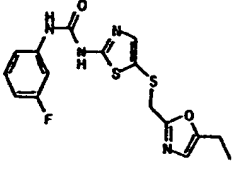
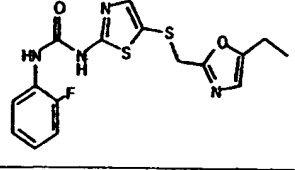
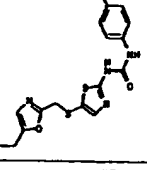
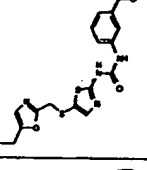
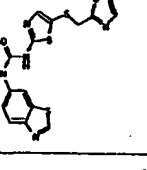
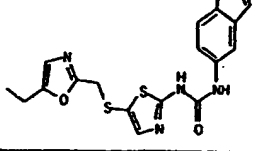
Example	Structure	Molecular Formula	(M+H)+
187		C ₂₀ H ₂₃ N ₃ O ₂ S ₂	402
188		C ₂₃ H ₂₁ N ₃ O ₂ S ₂	436
189		C ₂₄ H ₂₃ N ₃ O ₂ S ₂	450
190		C ₂₃ H ₂₁ N ₃ O ₂ S ₂	436
191		C ₂₁ H ₁₉ N ₃ O ₂ S ₂	410
192		C ₂₁ H ₁₉ N ₃ O ₂ S ₂	410
193		C ₁₇ H ₁₅ Cl ₂ N ₃ O ₂ S ₂	429
194		C ₁₉ H ₂₁ N ₃ O ₄ S ₂	420

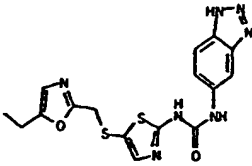
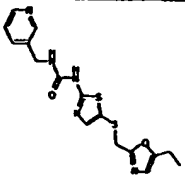
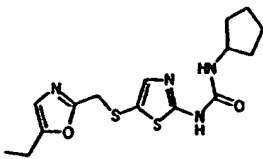
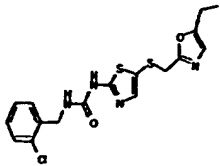
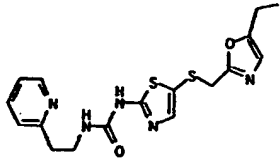
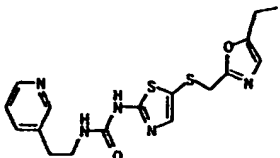
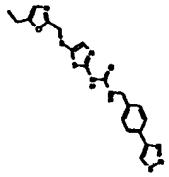
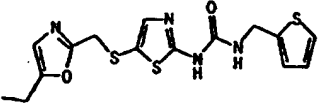
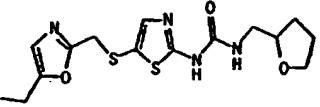
Example	Structure	Molecular Formula	(M+H) ⁺
195		C ₁₈ H ₁₉ N ₃ O ₂ S ₂	374
196		C ₁₉ H ₁₈ F ₃ N ₃ O ₃ S ₂	458
197		C ₂₂ H ₂₇ N ₃ O ₂ S ₂	430
198		C ₁₈ H ₁₉ N ₃ O ₂ S ₂	374
199		C ₁₂ H ₁₅ N ₃ O ₂ S ₂	298
200		C ₁₈ H ₂₆ N ₄ O ₄ S ₂	427
201		C ₁₂ H ₁₃ N ₃ O ₄ S ₂	328
202		C ₁₁ H ₁₃ N ₃ O ₄ S ₂	316
203		C ₁₁ H ₁₃ N ₃ O ₃ S ₂	300

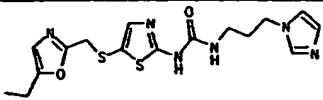
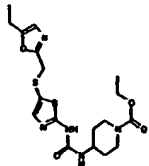
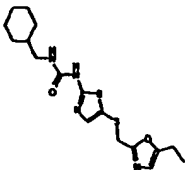
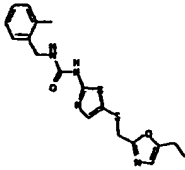
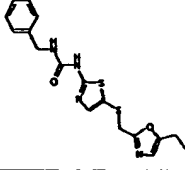
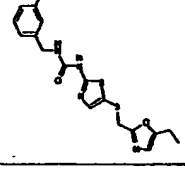
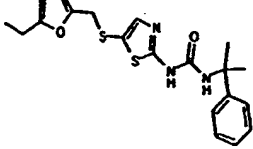
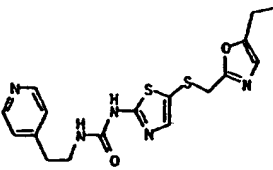
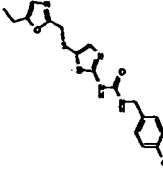
Example	Structure	Molecular Formula	(M+H)+
204		C ₁₁ H ₁₅ N ₃ O S ₂	270
205		C ₁₀ H ₁₃ N ₃ O S ₂	256
206		C ₁₇ H ₁₆ N ₄ O ₄ S ₂	405
207		C ₁₉ H ₂₀ N ₄ O ₂ S ₂	401
208		C ₁₆ H ₁₅ Br N ₄ O ₂ S ₂	440
209		C ₁₇ H ₁₆ N ₆ O ₂ S ₂	515
210		C ₁₉ H ₁₇ N ₅ O ₂ S ₂	526
211		C ₂₀ H ₂₃ N ₅ O ₃ S ₂	560

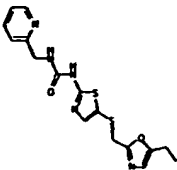
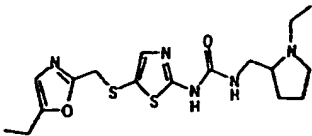
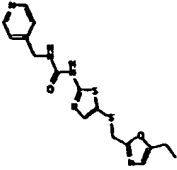
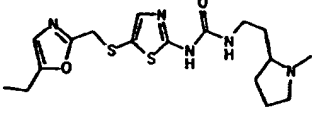
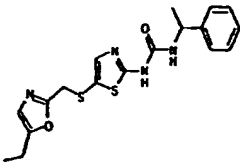
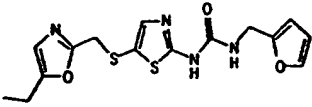
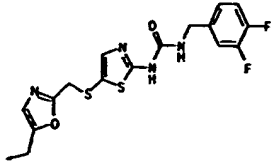
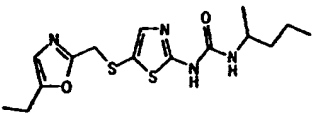
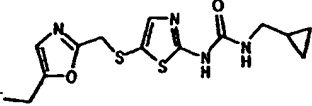
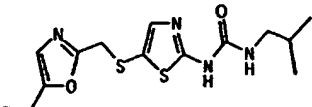
Example	Structure	Molecular Formula	(M+H) ⁺
212		C ₁₆ H ₁₆ N ₄ O ₂ S ₂	361
213		C ₁₆ H ₁₄ F ₂ N ₄ O ₂ S ₂	397
214		C ₁₆ H ₁₅ Cl N ₄ O ₂ S ₂	395
215		C ₁₇ H ₁₈ N ₄ O ₃ S ₂	391
216		C ₁₇ H ₁₈ N ₄ O ₂ S ₂	375
217		C ₁₆ H ₁₅ Br N ₄ O ₂ S ₂	440
218		C ₁₆ H ₁₅ Cl N ₄ O ₂ S ₂	395
219		C ₁₆ H ₁₄ Cl ₂ N ₄ O ₂ S ₂	430

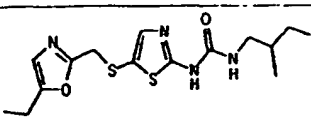
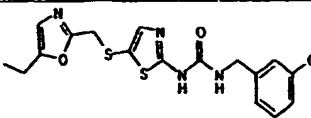
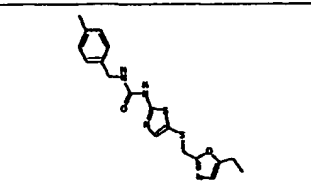
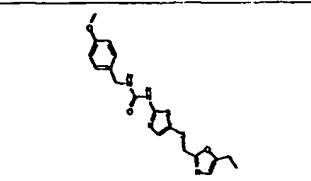
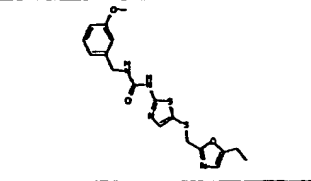
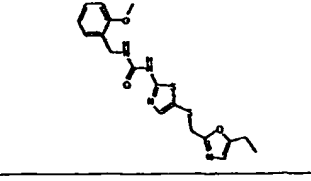
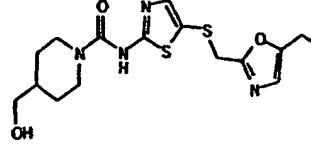
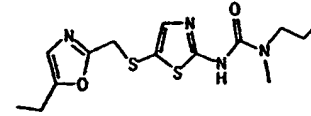
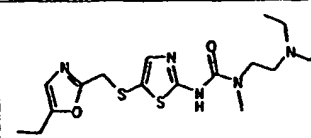
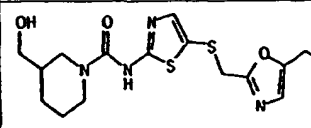
Example	Structure	Molecular Formula	(M+H)+
220		C ₁₇ H ₁₇ Cl N ₄ O ₃ S ₂	425
221		C ₁₇ H ₁₈ N ₄ O ₃ S ₂	391
222		C ₁₆ H ₁₅ Br N ₄ O ₂ S ₂	440
223		C ₁₆ H ₁₅ F N ₄ O ₂ S ₂	379
224		C ₁₇ H ₁₈ N ₄ O ₂ S ₂	375
225		C ₁₇ H ₁₈ N ₄ O ₃ S ₂	391
226		C ₁₆ H ₁₅ Cl N ₄ O ₂ S ₂	395
227		C ₁₈ H ₁₉ N ₅ O ₃ S ₂	418

Example	Structure	Molecular Formula	(M+H) ⁺
228		C ₁₇ H ₁₈ N ₄ O ₃ S ₂	391
229		C ₁₈ H ₂₁ N ₅ O ₂ S ₂	518
230		C ₁₆ H ₁₅ F N ₄ O ₂ S ₂	379
231		C ₁₆ H ₁₅ F N ₄ O ₂ S ₂	379
232		C ₁₇ H ₁₈ N ₄ O ₂ S ₂	375
233		C ₁₇ H ₁₇ N ₅ O ₃ S ₂	404
234		C ₁₇ H ₁₅ N ₅ O ₂ S ₃	418
235		C ₁₇ H ₁₆ N ₆ O ₂ S ₂	401

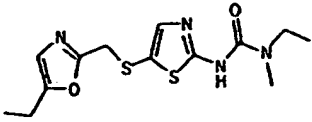
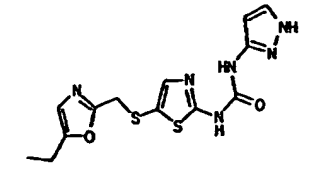
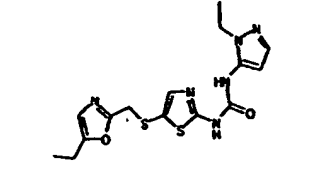
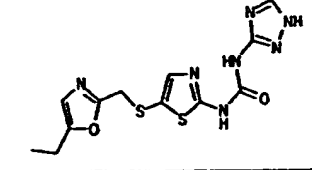
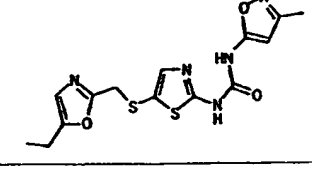
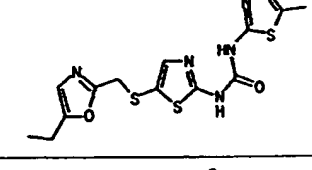
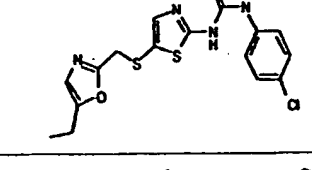
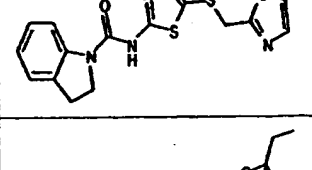
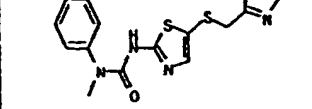
Example	Structure	Molecular Formula	(M+H)+
236		C ₁₆ H ₁₅ N ₇ O ₂ S ₂	402
237		C ₁₆ H ₁₇ N ₅ O ₂ S ₂	490
238		C ₁₅ H ₂₀ N ₄ O ₂ S ₂	353
239		C ₁₇ H ₁₇ Cl N ₄ O ₂ S ₂	409
240		C ₁₇ H ₁₉ N ₅ O ₂ S ₂	504
241		C ₁₇ H ₁₉ N ₅ O ₂ S ₂	504
242		C ₁₉ H ₁₈ N ₆ O ₂ S ₃	459
243		C ₁₅ H ₁₆ N ₄ O ₂ S ₃	381
244		C ₁₅ H ₂₀ N ₄ O ₃ S ₂	369

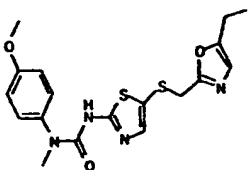
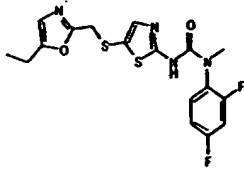
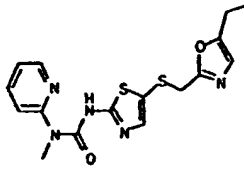
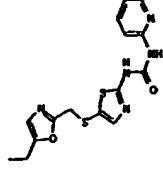
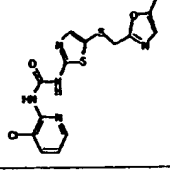
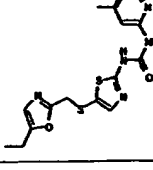
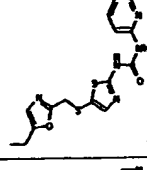
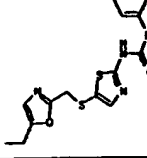
Example	Structure	Molecular Formula	(M+H) ⁺
245		C ₁₆ H ₂₀ N ₆ O ₂ S ₂	507
246		C ₁₈ H ₂₅ N ₅ O ₄ S ₂	440
247		C ₁₇ H ₂₄ N ₄ O ₂ S ₂	381
248		C ₁₈ H ₂₀ N ₄ O ₂ S ₂	389
249		C ₁₇ H ₁₈ N ₄ O ₂ S ₂	375
250		C ₁₈ H ₂₀ N ₄ O ₂ S ₂	389
251		C ₁₉ H ₂₂ N ₄ O ₂ S ₂	403
252		C ₁₇ H ₁₉ N ₅ O ₂ S ₂	504
253		C ₁₇ H ₁₇ Cl N ₄ O ₂ S ₂	409

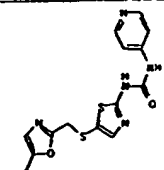
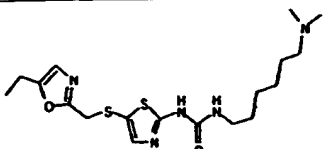
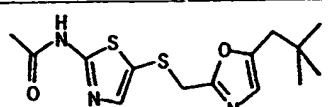
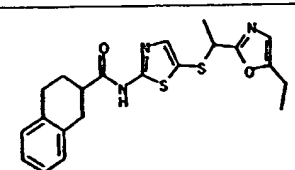
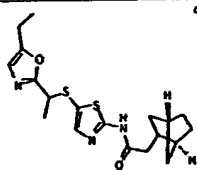
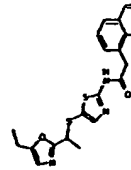
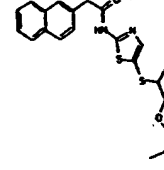
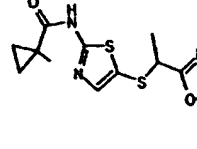
Example	Structure	Molecular Formula	(M+H)+
254		C ₁₆ H ₁₇ N ₅ O ₂ S ₂	490
255		C ₁₇ H ₂₅ N ₅ O ₂ S ₂	510
256		C ₁₆ H ₁₇ N ₅ O ₂ S ₂	490
257		C ₁₇ H ₂₅ N ₅ O ₂ S ₂	510
258		C ₁₈ H ₂₀ N ₄ O ₂ S ₂	389
259		C ₁₅ H ₁₆ N ₄ O ₃ S ₂	365
260		C ₁₇ H ₁₆ F ₂ N ₄ O ₂ S ₂	411
261		C ₁₅ H ₂₂ N ₄ O ₂ S ₂	355
262		C ₁₄ H ₁₈ N ₄ O ₂ S ₂	339
263		C ₁₄ H ₂₀ N ₄ O ₂ S ₂	341

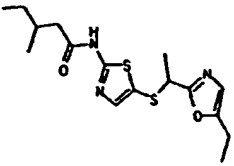
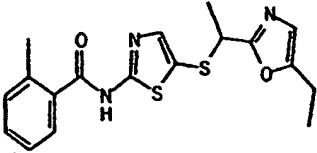
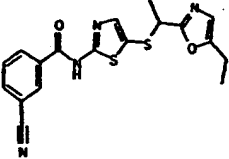
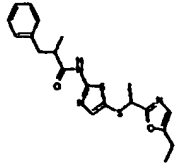
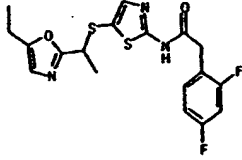
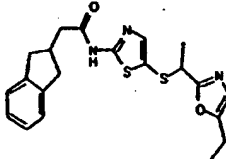
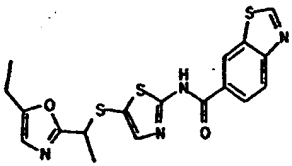
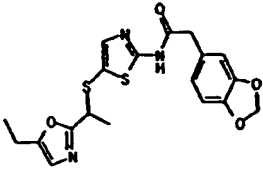
Example	Structure	Molecular Formula	(M+H)+
264		C ₁₅ H ₂₂ N ₄ O ₂ S ₂	355
265		C ₁₇ H ₁₇ Cl N ₄ O ₂ S ₂	409
266		C ₁₈ H ₂₀ N ₄ O ₂ S ₂	389
267		C ₁₈ H ₂₀ N ₄ O ₃ S ₂	405
268		C ₁₈ H ₂₀ N ₄ O ₃ S ₂	405
269		C ₁₈ H ₂₀ N ₄ O ₃ S ₂	405
270		C ₁₆ H ₂₂ N ₄ O ₃ S ₂	341
271		C ₁₄ H ₂₀ N ₄ O ₂ S ₂	512
272		C ₁₇ H ₂₇ N ₅ O ₂ S ₂	353
273		C ₁₆ H ₂₂ N ₄ O ₃ S ₂	425

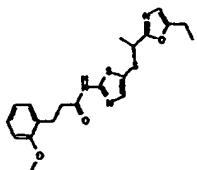
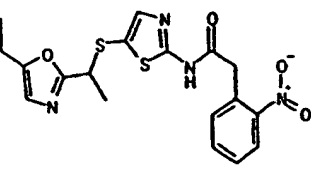
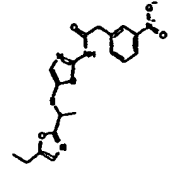
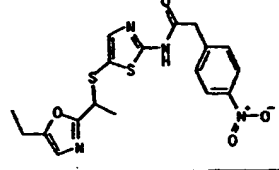
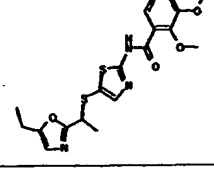
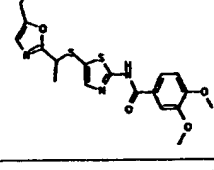
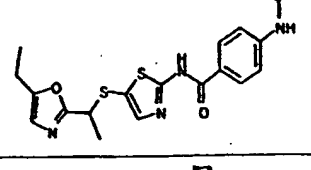
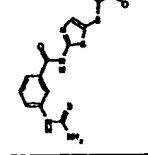
Example	Structure	Molecular Formula	(M+H)+
274		C ₁₈ H ₂₄ N ₄ O ₄ S ₂	401
275		C ₁₉ H ₂₀ N ₄ O ₂ S ₂	383
276		C ₁₇ H ₂₆ N ₄ O ₂ S ₂	355
277		C ₁₅ H ₂₂ N ₄ O ₂ S ₂	433
278		C ₁₉ H ₂₀ N ₄ O ₄ S ₂	512
279		C ₁₆ H ₂₁ N ₅ O ₃ S ₂	353
280		C ₁₅ H ₂₀ N ₄ O ₃ S ₂	367
281		C ₁₆ H ₂₂ N ₄ O ₂ S ₂	389
282		C ₁₆ H ₂₁ N ₅ O ₃ S ₂	425
283		C ₁₈ H ₂₄ N ₄ O ₄ S ₂	369

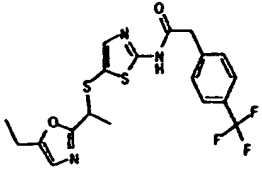
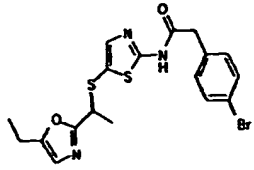
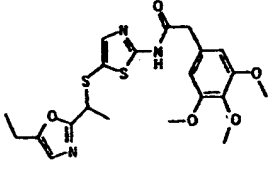
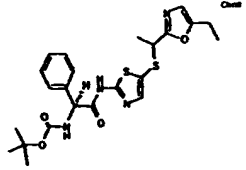
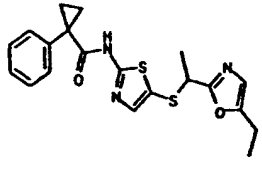
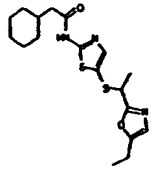
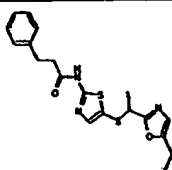
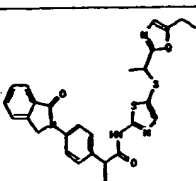
Example	Structure	Molecular Formula	(M+H) ⁺
284		C ₁₃ H ₁₈ N ₄ O ₂ S ₂	465
285		C ₁₃ H ₁₄ N ₆ O ₂ S ₂	493
286		C ₁₅ H ₁₈ N ₆ O ₂ S ₂	466
287		C ₁₂ H ₁₃ N ₇ O ₂ S ₂	366
288		C ₁₄ H ₁₅ N ₅ O ₃ S ₂	366
289		C ₁₃ H ₁₄ N ₆ O ₂ S ₃	409
290		C ₁₇ H ₁₇ Cl N ₄ O ₂ S ₂	387
291		C ₁₈ H ₁₈ N ₄ O ₂ S ₂	375
292		C ₁₇ H ₁₈ N ₄ O ₂ S ₂	405

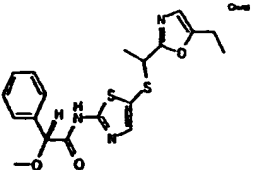
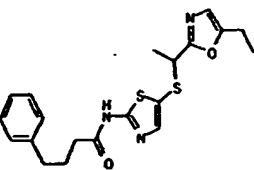
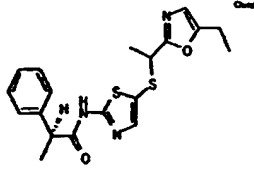
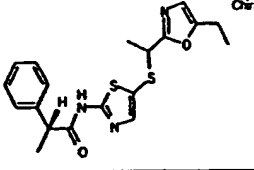
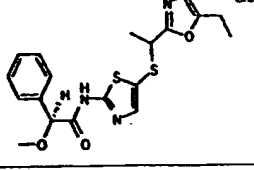
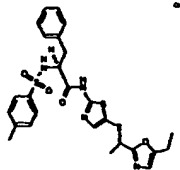
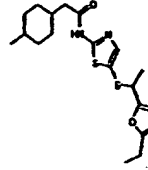
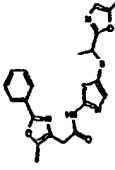
Example	Structure	Molecular Formula	(M+H) ⁺
293		C ₁₈ H ₂₀ N ₄ O ₃ S ₂	389
294		C ₁₇ H ₁₆ F ₂ N ₄ O ₂ S ₂	490
295		C ₁₆ H ₁₇ N ₅ O ₂ S ₂	476
296		C ₁₅ H ₁₅ N ₅ O ₂ S ₂	510
297		C ₁₅ H ₁₄ Cl N ₅ O ₂ S ₂	490
298		C ₁₆ H ₁₇ N ₅ O ₂ S ₂	490
299		C ₁₆ H ₁₇ N ₅ O ₂ S ₂	476
300		C ₁₅ H ₁₅ N ₅ O ₂ S ₂	526

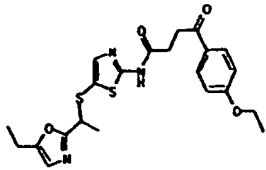
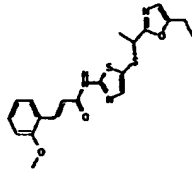
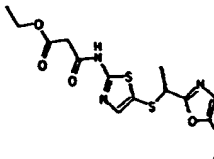
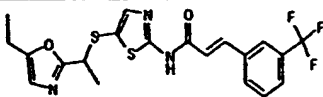
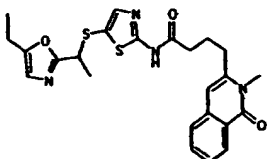
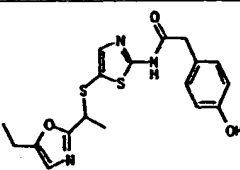
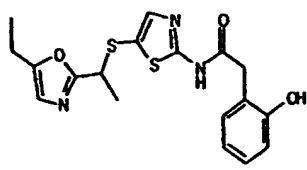
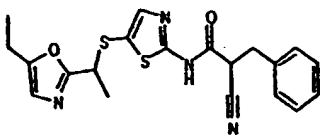
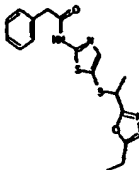
Example	Structure	Molecular Formula	(M+H) ⁺
301		C ₁₅ H ₁₅ N ₅ O ₂ S ₂	540
302		C ₁₈ H ₂₉ N ₅ O ₂ S ₂	526
303		C ₁₄ H ₁₉ N ₃ O ₂ S ₂	326
304		C ₂₁ H ₂₃ N ₃ O ₂ S ₂	414
305		C ₁₉ H ₂₅ N ₃ O ₂ S ₂	392
306		C ₂₂ H ₂₁ N ₃ O ₂ S ₂	424
307		C ₂₂ H ₂₁ N ₃ O ₂ S ₂	424
308		C ₁₅ H ₁₉ N ₃ O ₂ S ₂	338

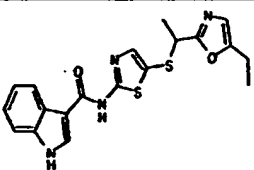
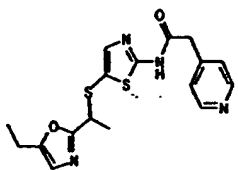
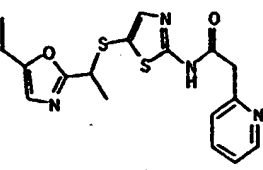
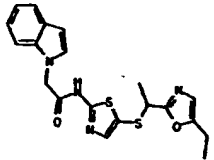
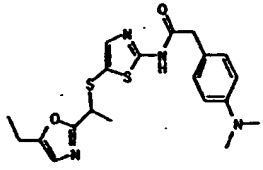
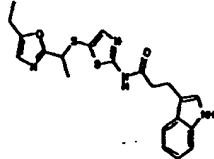
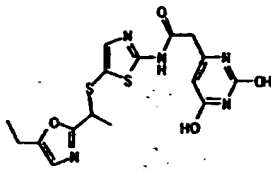
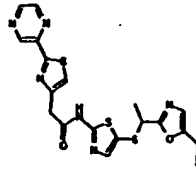
Example	Structure	Molecular Formula	(M+H)+
309		C ₁₆ H ₂₃ N ₃ O ₂ S ₂	354
310		C ₁₈ H ₁₉ N ₃ O ₂ S ₂	374
311		C ₁₈ H ₁₆ N ₄ O ₂ S ₂	385
312		C ₂₀ H ₂₃ N ₃ O ₂ S ₂	402
313		C ₁₈ H ₁₇ F ₂ N ₃ O ₂ S ₂	410
314		C ₂₁ H ₂₃ N ₃ O ₂ S ₂	414
315		C ₁₈ H ₁₆ N ₄ O ₂ S ₃	417
316		C ₁₉ H ₁₉ N ₃ O ₄ S ₂	418

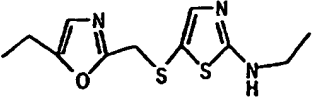
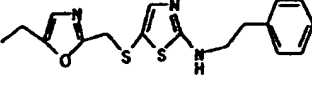
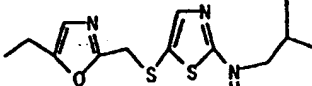
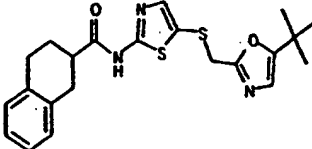
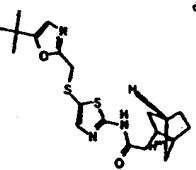
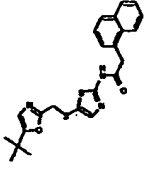
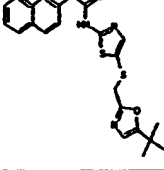
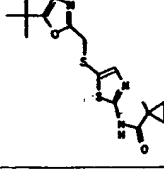
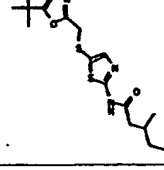
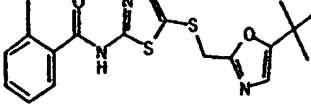
Example	Structure	Molecular Formula	(M+H) ⁺
317		C ₂₀ H ₂₃ N ₃ O ₃ S ₂	418
318		C ₁₈ H ₁₈ N ₄ O ₄ S ₂	419
319		C ₁₈ H ₁₈ N ₄ O ₄ S ₂	419
320		C ₁₈ H ₁₈ N ₄ O ₄ S ₂	419
321		C ₁₉ H ₂₁ N ₃ O ₄ S ₂	420
322		C ₁₉ H ₂₁ N ₃ O ₄ S ₂	420
323		C ₁₈ H ₁₉ N ₅ O ₂ S ₃	434
324		C ₁₈ H ₁₉ N ₅ O ₂ S ₃	434

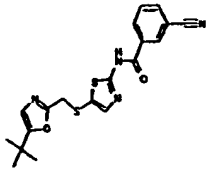
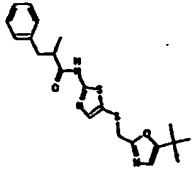
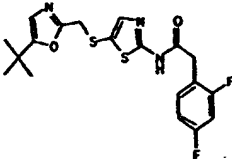
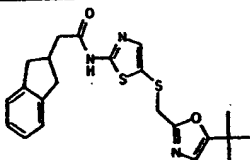
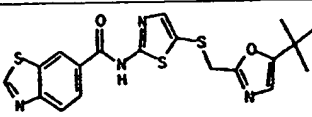
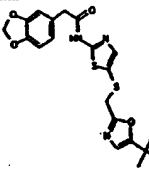
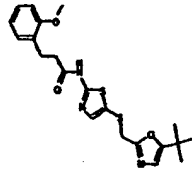
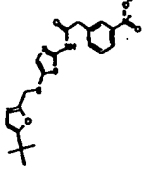
Example	Structure	Molecular Formula	(M+H)+
325		C ₁₉ H ₁₈ F ₃ N ₃ O ₂ S ₂	442
326		C ₁₈ H ₁₈ Br N ₃ O ₂ S ₂	453
327		C ₂₁ H ₂₅ N ₃ O ₅ S ₂	464
328		C ₂₃ H ₂₈ N ₄ O ₄ S ₂	489
329		C ₂₀ H ₂₁ N ₃ O ₂ S ₂	400
330		C ₁₈ H ₂₅ N ₃ O ₂ S ₂	380
331		C ₁₉ H ₂₁ N ₃ O ₂ S ₂	388
332		C ₂₇ H ₂₆ N ₄ O ₃ S ₂	519

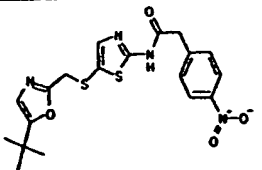
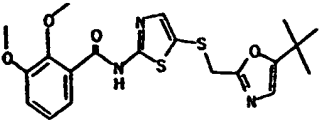
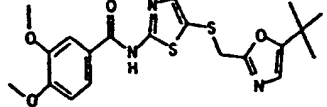
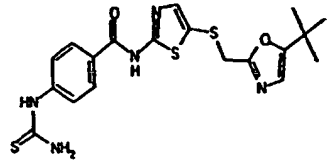
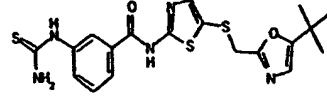
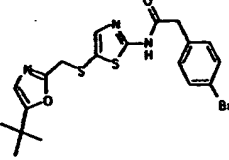
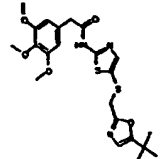
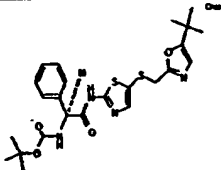
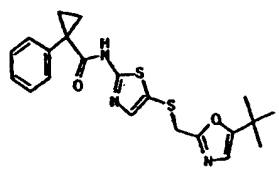
Example	Structure	Molecular Formula	(M+H) ⁺
333		C ₁₉ H ₂₁ N ₃ O ₃ S ₂	404
334		C ₂₀ H ₂₃ N ₃ O ₂ S ₂	402
335		C ₁₉ H ₂₁ N ₃ O ₂ S ₂	388
336		C ₁₉ H ₂₁ N ₃ O ₂ S ₂	388
337		C ₁₉ H ₂₁ N ₃ O ₃ S ₂	404
338		C ₂₆ H ₂₈ N ₄ O ₄ S ₃	557
339		C ₁₉ H ₂₇ N ₃ O ₂ S ₂	394
340		C ₂₂ H ₂₂ N ₄ O ₃ S ₂	455

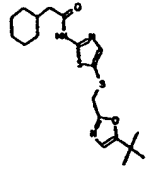
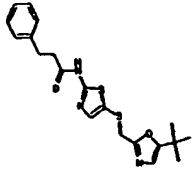
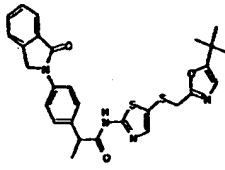
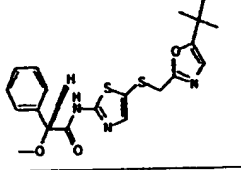
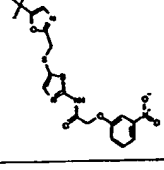
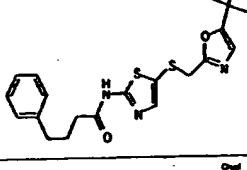
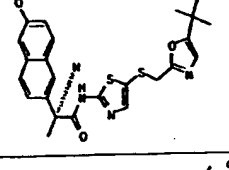
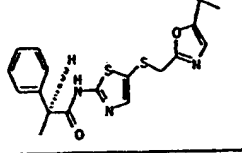
Example	Structure	Molecular Formula	(M+H) ⁺
341		C ₂₂ H ₂₅ N ₃ O ₄ S ₂	460
342		C ₂₀ H ₂₁ N ₃ O ₃ S ₂	416
343		C ₁₅ H ₁₉ N ₃ O ₄ S ₂	370
344		C ₂₀ H ₁₈ F ₃ N ₃ O ₂ S ₂	454
345		C ₂₄ H ₂₆ N ₄ O ₃ S ₂	483
346		C ₁₈ H ₁₉ N ₃ O ₃ S ₂	390
347		C ₁₈ H ₁₉ N ₃ O ₃ S ₂	390
348		C ₂₀ H ₂₀ N ₄ O ₂ S ₂	413
349		C ₁₈ H ₁₉ N ₃ O ₂ S ₂	374

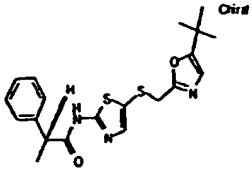
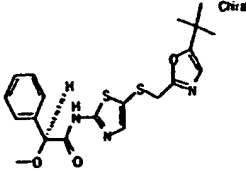
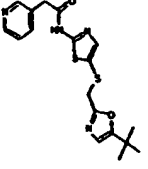
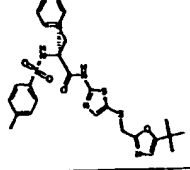
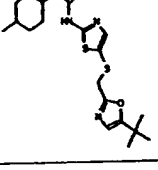
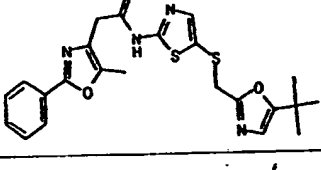
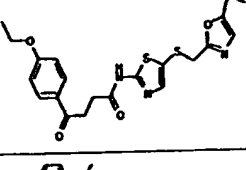
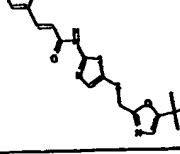
Example	Structure	Molecular Formula	(M+H) ⁺
350		C ₁₉ H ₁₈ N ₄ O ₂ S ₂	399
351		C ₁₇ H ₁₈ N ₄ O ₂ S ₂	489
352		C ₁₇ H ₁₈ N ₄ O ₂ S ₂	489
353		C ₂₀ H ₂₀ N ₄ O ₂ S ₂	413
354		C ₂₀ H ₂₄ N ₄ O ₂ S ₂	531
355		C ₂₁ H ₂₂ N ₄ O ₂ S ₂	427
356		C ₁₆ H ₁₇ N ₅ O ₄ S ₂	408
357		C ₁₉ H ₁₈ N ₆ O ₂ S ₃	687

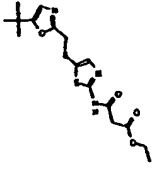
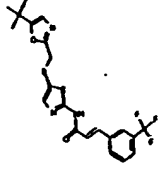
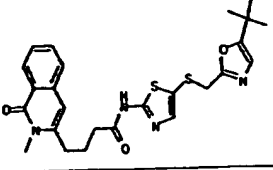
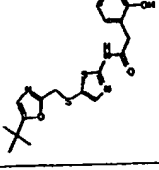
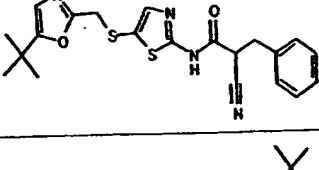
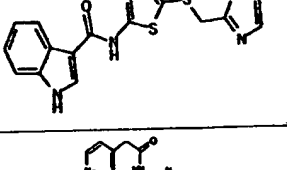
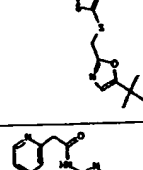
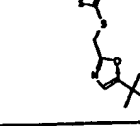
Example	Structure	Molecular Formula	(M+H) ⁺
358		C ₁₁ H ₁₅ N ₃ O S ₂	270
359		C ₁₇ H ₁₉ N ₃ O S ₂	346
360		C ₁₃ H ₁₉ N ₃ O S ₂	298
361		C ₂₂ H ₂₅ N ₃ O ₂ S ₂	428
362		C ₂₀ H ₂₇ N ₃ O ₂ S ₂	406
363		C ₂₃ H ₂₃ N ₃ O ₂ S ₂	438
364		C ₂₃ H ₂₃ N ₃ O ₂ S ₂	438
365		C ₁₆ H ₂₁ N ₃ O ₂ S ₂	352
366		C ₁₇ H ₂₅ N ₃ O ₂ S ₂	368
367		C ₁₉ H ₂₁ N ₃ O ₂ S ₂	388

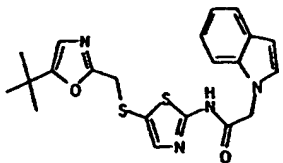
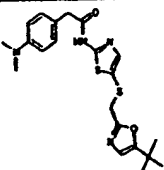
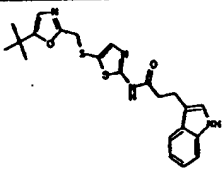
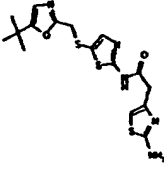
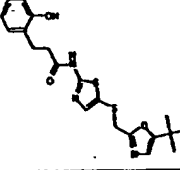
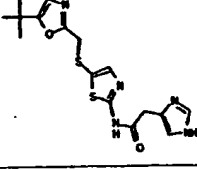
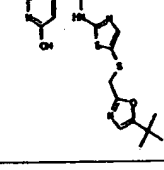
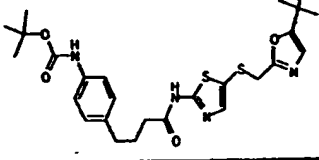
Example	Structure	Molecular Formula	(M+H)+
368		C ₁₉ H ₁₈ N ₄ O ₂ S ₂	399
369		C ₂₁ H ₂₅ N ₃ O ₂ S ₂	416
370		C ₁₉ H ₁₉ F ₂ N ₃ O ₂ S ₂	424
371		C ₂₂ H ₂₅ N ₃ O ₂ S ₂	428
372		C ₁₉ H ₁₈ N ₄ O ₂ S ₃	431
373		C ₂₀ H ₂₁ N ₃ O ₄ S ₂	432
374		C ₂₁ H ₂₅ N ₃ O ₃ S ₂	432
375		C ₁₉ H ₂₀ N ₄ O ₄ S ₂	433

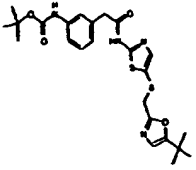
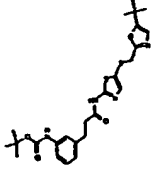
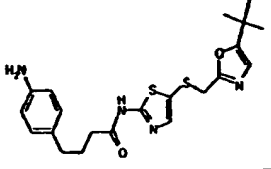
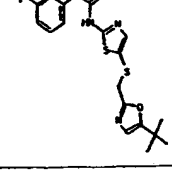
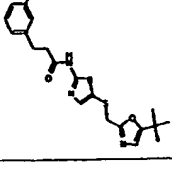
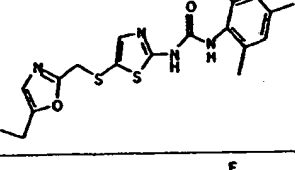
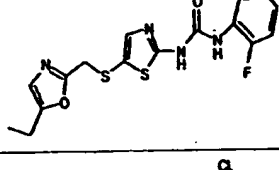
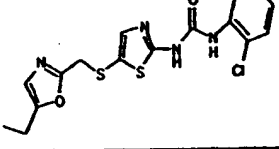
Example	Structure	Molecular Formula	(M+H) ⁺
376		C ₁₉ H ₂₀ N ₄ O ₄ S ₂	433
377		C ₂₀ H ₂₃ N ₃ O ₄ S ₂	434
378		C ₂₀ H ₂₃ N ₃ O ₄ S ₂	434
379		C ₁₉ H ₂₁ N ₅ O ₂ S ₃	448
380		C ₁₉ H ₂₁ N ₅ O ₂ S ₃	448
381		C ₁₉ H ₂₀ Br N ₃ O ₂ S ₂	467
382		C ₂₂ H ₂₇ N ₃ O ₅ S ₂	478
383		C ₂₄ H ₃₀ N ₄ O ₄ S ₂	503
384		C ₂₁ H ₂₃ N ₃ O ₂ S ₂	414

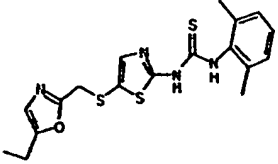
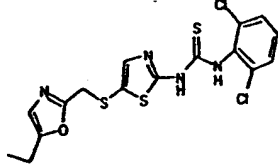
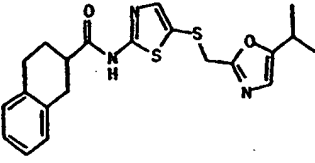
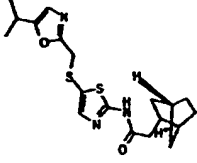
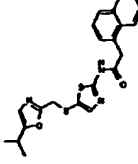
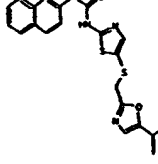
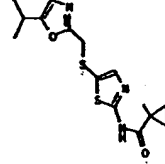
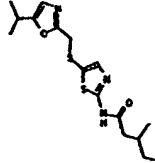
Example	Structure	Molecular Formula	(M+H) ⁺
385		C ₁₉ H ₂₇ N ₃ O ₂ S ₂	394
386		C ₂₀ H ₂₃ N ₃ O ₂ S ₂	402
387		C ₂₈ H ₂₈ N ₄ O ₃ S ₂	533
388		C ₂₀ H ₂₃ N ₃ O ₃ S ₂	418
389		C ₁₉ H ₂₀ N ₄ O ₅ S ₂	449
390		C ₂₁ H ₂₅ N ₃ O ₂ S ₂	416
391		C ₂₅ H ₂₇ N ₃ O ₃ S ₂	482
392		C ₂₀ H ₂₃ N ₃ O ₂ S ₂	402

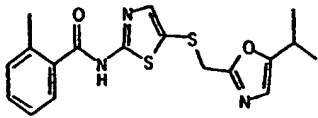
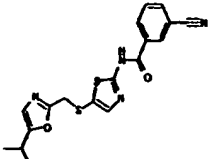
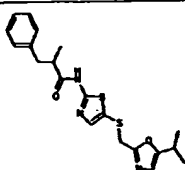
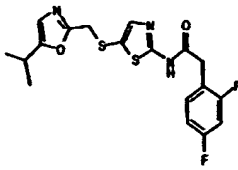
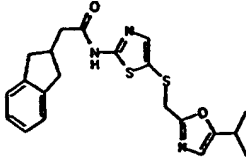
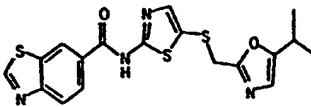
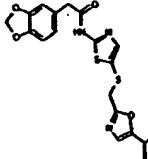
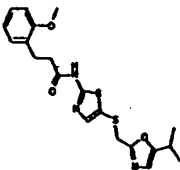
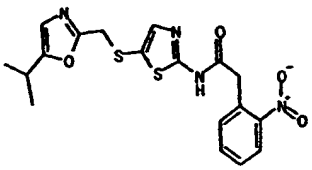
Example	Structure	Molecular Formula	(M+H)+
393		C ₂₀ H ₂₃ N ₃ O ₂ S ₂	402
394		C ₂₀ H ₂₃ N ₃ O ₃ S ₂	418
395		C ₁₈ H ₂₀ N ₄ O ₂ S ₂	503
396		C ₂₇ H ₃₀ N ₄ O ₄ S ₃	571
397		C ₂₀ H ₂₉ N ₃ O ₂ S ₂	408
398		C ₂₃ H ₂₄ N ₄ O ₃ S ₂	469
399		C ₂₃ H ₂₇ N ₃ O ₄ S ₂	474
400		C ₂₁ H ₂₃ N ₃ O ₃ S ₂	430

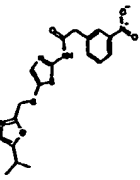
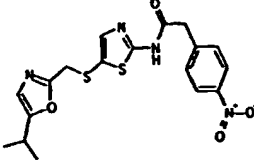
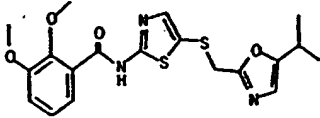
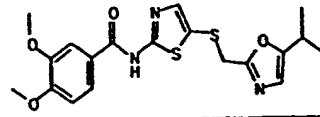
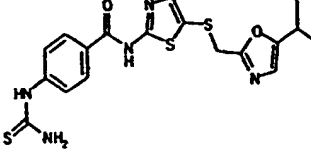
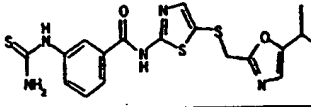
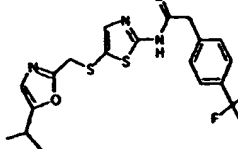
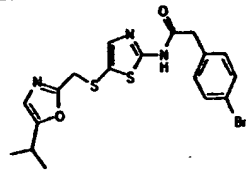
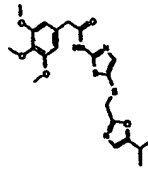
Example	Structure	Molecular Formula	(M+H)+
401		C ₁₆ H ₂₁ N ₃ O ₄ S ₂	384
402		C ₂₁ H ₂₀ F ₃ N ₃ O ₂ S ₂	468
403		C ₂₅ H ₂₈ N ₄ O ₃ S ₂	497
404		C ₁₉ H ₂₁ N ₃ O ₃ S ₂	404
405		C ₂₁ H ₂₂ N ₄ O ₂ S ₂	427
406		C ₂₀ H ₂₀ N ₄ O ₂ S ₂	413
407		C ₁₈ H ₂₀ N ₄ O ₂ S ₂	503
408		C ₁₈ H ₂₀ N ₄ O ₂ S ₂	503

Example	Structure	Molecular Formula	(M+H) ⁺
409		C ₂₁ H ₂₂ N ₄ O ₂ S ₂	427
410		C ₂₁ H ₂₆ N ₄ O ₂ S ₂	545
411		C ₂₂ H ₂₄ N ₄ O ₂ S ₂	441
412		C ₁₆ H ₁₉ N ₅ O ₂ S ₃	524
413		C ₂₀ H ₂₃ N ₃ O ₃ S ₂	418
414		C ₁₆ H ₁₉ N ₅ O ₂ S ₂	492
415		C ₁₇ H ₁₉ N ₅ O ₄ S ₂	422
416		C ₂₆ H ₃₄ N ₄ O ₄ S ₂	531

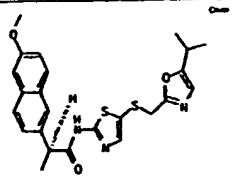
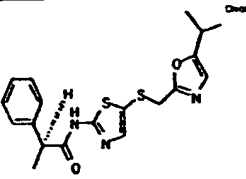
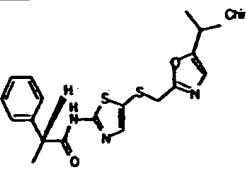
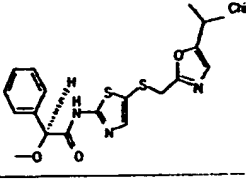
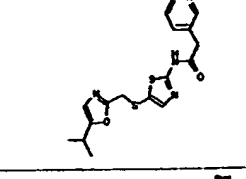
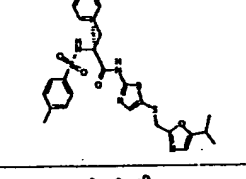
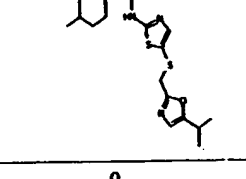
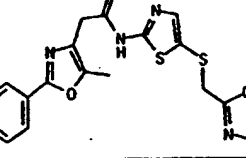
Example	Structure	Molecular Formula	(M+H)+
417		C ₂₄ H ₃₀ N ₄ O ₄ S ₂	503
418		C ₂₅ H ₃₂ N ₄ O ₄ S ₂	517
419		C ₂₁ H ₂₆ N ₄ O ₂ S ₂	545
420		C ₁₉ H ₂₂ N ₄ O ₂ S ₂	517
421		C ₂₀ H ₂₄ N ₄ O ₂ S ₂	531
422		C ₁₉ H ₂₂ N ₄ O ₂ S ₂	403
423		C ₁₆ H ₁₄ F ₂ N ₄ O ₂ S ₂	397
424		C ₁₆ H ₁₄ Cl ₂ N ₄ O ₂ S ₂	430

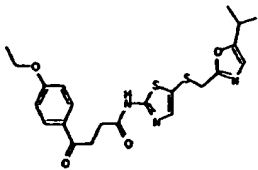
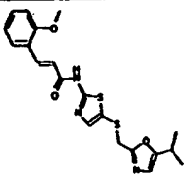
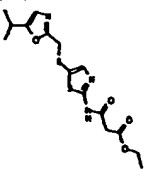
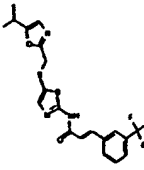
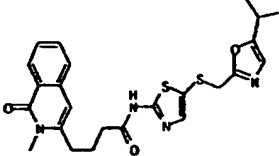
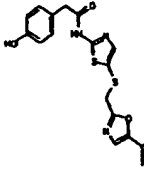
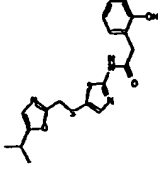
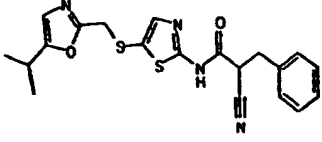
Example	Structure	Molecular Formula	(M+H)+
425		C ₁₈ H ₂₀ N ₄ O S ₃	405
426		C ₁₆ H ₁₄ Cl ₂ N ₄ O S ₃	446
427		C ₂₁ H ₂₃ N ₃ O ₂ S ₂	414
428		C ₁₉ H ₂₅ N ₃ O ₂ S ₂	392
429		C ₂₂ H ₂₁ N ₃ O ₂ S ₂	424
430		C ₂₂ H ₂₁ N ₃ O ₂ S ₂	424
431		C ₁₅ H ₁₉ N ₃ O ₂ S ₂	338
432		C ₁₆ H ₂₃ N ₃ O ₂ S ₂	354

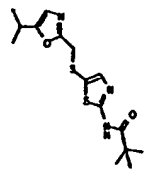
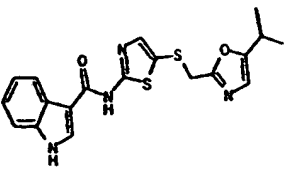
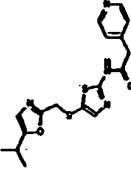
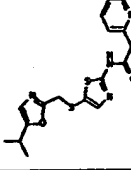
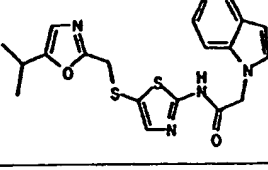
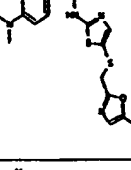
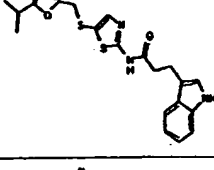
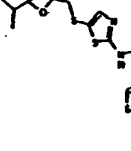
Example	Structure	Molecular Formula	(M+H) ⁺
433		C ₁₈ H ₁₉ N ₃ O ₂ S ₂	374
434		C ₁₈ H ₁₆ N ₄ O ₂ S ₂	385
435		C ₂₀ H ₂₃ N ₃ O ₂ S ₂	402
436		C ₁₈ H ₁₇ F ₂ N ₃ O ₂ S ₂	410
437		C ₂₁ H ₂₃ N ₃ O ₂ S ₂	414
438		C ₁₈ H ₁₆ N ₄ O ₂ S ₃	417
439		C ₁₉ H ₁₉ N ₃ O ₄ S ₂	418
440		C ₂₀ H ₂₃ N ₃ O ₃ S ₂	418
441		C ₁₈ H ₁₈ N ₄ O ₄ S ₂	419

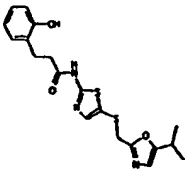
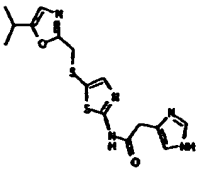
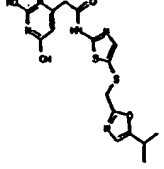
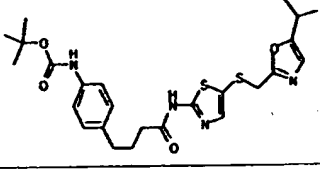
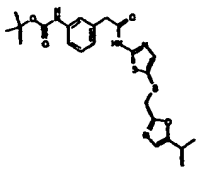
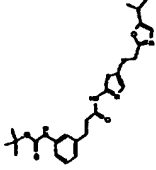
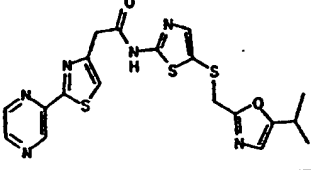
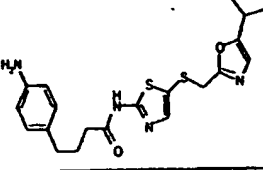
Example	Structure	Molecular Formula	(M+H) ⁺
442		C ₁₈ H ₁₈ N ₄ O ₄ S ₂	419
443		C ₁₈ H ₁₈ N ₄ O ₄ S ₂	419
444		C ₁₉ H ₂₁ N ₃ O ₄ S ₂	420
445		C ₁₉ H ₂₁ N ₃ O ₄ S ₂	420
446		C ₁₈ H ₁₉ N ₅ O ₂ S ₃	434
447		C ₁₈ H ₁₉ N ₅ O ₂ S ₃	434
448		C ₁₉ H ₁₈ F ₃ N ₃ O ₂ S ₂	442
449		C ₁₈ H ₁₈ Br N ₃ O ₂ S ₂	453
450		C ₂₁ H ₂₅ N ₃ O ₅ S ₂	464

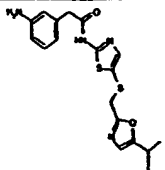
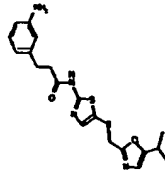
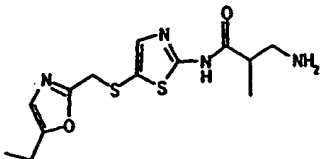
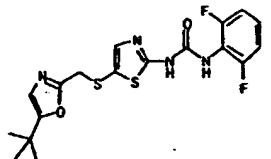
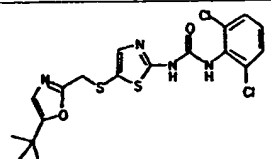
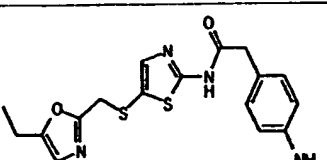
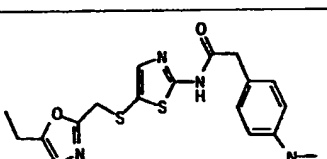
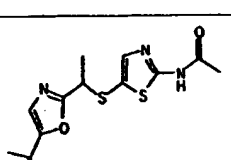
Example	Structure	Molecular Formula	(M+H) ⁺
451		C ₂₃ H ₂₈ N ₄ O ₄ S ₂	489
452		C ₂₀ H ₂₁ N ₃ O ₂ S ₂	400
453		C ₁₈ H ₂₅ N ₃ O ₂ S ₂	380
454		C ₁₉ H ₂₁ N ₃ O ₂ S ₂	388
455		C ₂₇ H ₂₆ N ₄ O ₃ S ₂	519
456		C ₁₉ H ₂₁ N ₃ O ₃ S ₂	404
457		C ₁₈ H ₁₈ N ₄ O ₅ S ₂	435
458		C ₂₀ H ₂₃ N ₃ O ₂ S ₂	402

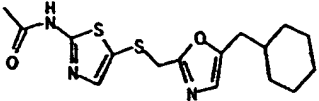
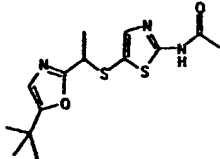
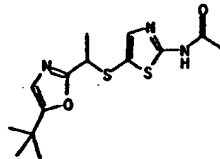
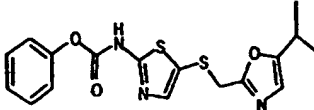
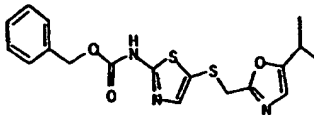
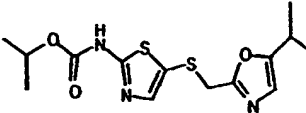
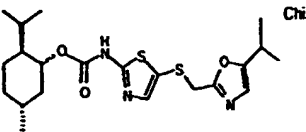
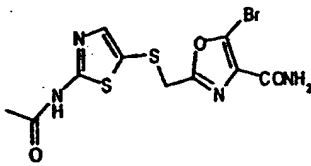
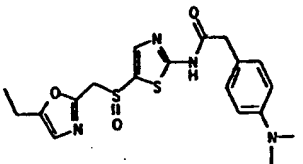
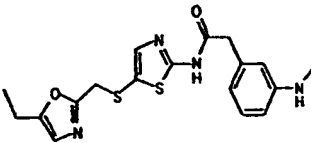
Example	Structure	Molecular Formula	(M+H)+
459		C ₂₄ H ₂₅ N ₃ O ₃ S ₂	468
460		C ₁₉ H ₂₁ N ₃ O ₂ S ₂	388
461		C ₁₉ H ₂₁ N ₃ O ₂ S ₂	388
462		C ₁₉ H ₂₁ N ₃ O ₃ S ₂	404
463		C ₁₇ H ₁₈ N ₄ O ₂ S ₂	489
464		C ₂₆ H ₂₈ N ₄ O ₄ S ₃	557
465		C ₁₉ H ₂₇ N ₃ O ₂ S ₂	394
466		C ₂₂ H ₂₂ N ₄ O ₃ S ₂	455

Example	Structure	Molecular Formula	(M+H) ⁺
467		C ₂₂ H ₂₅ N ₃ O ₄ S ₂	460
468		C ₂₀ H ₂₁ N ₃ O ₃ S ₂	416
469		C ₁₅ H ₁₉ N ₃ O ₄ S ₂	370
470		C ₂₀ H ₁₈ F ₃ N ₃ O ₂ S ₂	454
471		C ₂₄ H ₂₆ N ₄ O ₃ S ₂	483
472		C ₁₈ H ₁₉ N ₃ O ₃ S ₂	390
473		C ₁₈ H ₁₉ N ₃ O ₃ S ₂	390
474		C ₂₀ H ₂₀ N ₄ O ₂ S ₂	413

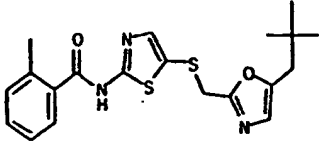
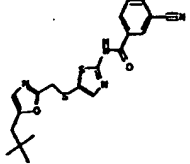
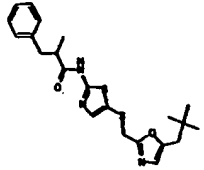
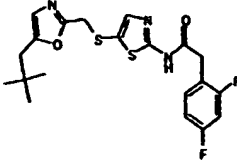
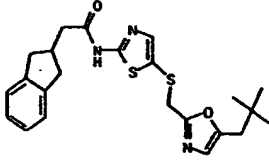
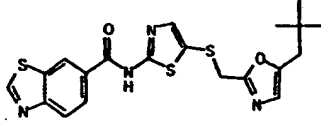
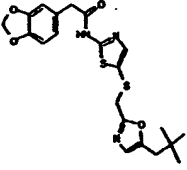
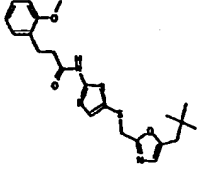
Example	Structure	Molecular Formula	(M+H) ⁺
475		C ₁₅ H ₂₁ N ₃ O ₂ S ₂	340
476		C ₁₉ H ₁₈ N ₄ O ₂ S ₂	399
477		C ₁₇ H ₁₈ N ₄ O ₂ S ₂	489
478		C ₁₇ H ₁₈ N ₄ O ₂ S ₂	489
479		C ₂₀ H ₂₀ N ₄ O ₂ S ₂	413
480		C ₂₀ H ₂₄ N ₄ O ₂ S ₂	531
481		C ₂₁ H ₂₂ N ₄ O ₂ S ₂	427
482		C ₁₅ H ₁₇ N ₅ O ₂ S ₃	510

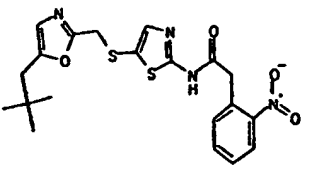
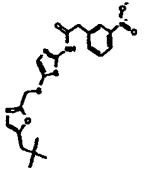
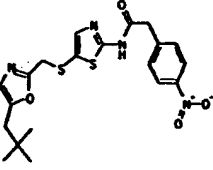
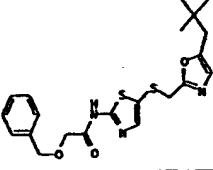
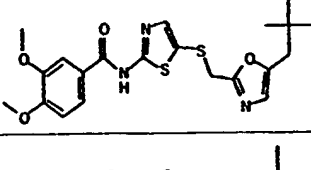
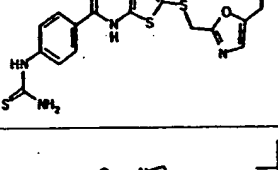
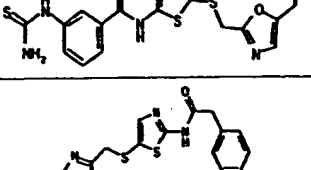
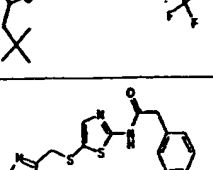
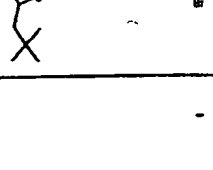
Example	Structure	Molecular Formula	(M+H) ⁺
483		C ₁₉ H ₂₁ N ₃ O ₃ S ₂	404
484		C ₁₅ H ₁₇ N ₅ O ₂ S ₂	478
485		C ₁₆ H ₁₇ N ₅ O ₄ S ₂	408
486		C ₂₅ H ₃₂ N ₄ O ₄ S ₂	517
487		C ₂₃ H ₂₈ N ₄ O ₄ S ₂	489
488		C ₂₄ H ₃₀ N ₄ O ₄ S ₂	503
489		C ₁₉ H ₁₈ N ₆ O ₂ S ₃	459
490		C ₂₀ H ₂₄ N ₄ O ₂ S ₂	531

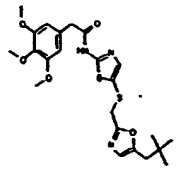
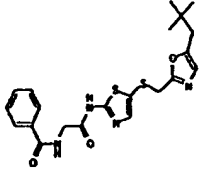
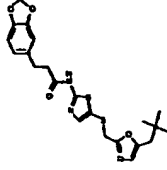
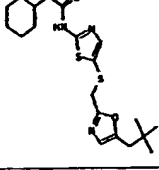
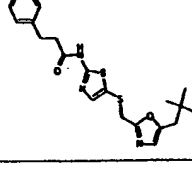
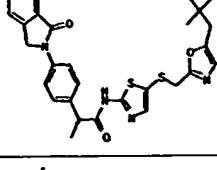
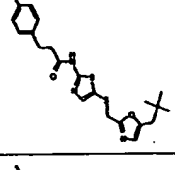
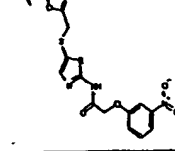
Example	Structure	Molecular Formula	(M+H) ⁺
491		C ₁₈ H ₂₀ N ₄ O ₂ S ₂	503
492		C ₁₉ H ₂₂ N ₄ O ₂ S ₂	517
493		C ₁₃ H ₁₈ N ₄ O ₂ S ₂	363
494		C ₁₈ H ₁₈ F ₂ N ₄ O ₂ S ₂	425
495		C ₁₈ H ₁₈ Cl ₂ N ₄ O ₂ S ₂	458
496		C ₁₇ H ₁₈ N ₄ O ₂ S ₂	489
497		C ₁₈ H ₂₀ N ₄ O ₂ S ₂	389
498		C ₁₄ H ₁₉ N ₃ O ₂ S ₂	326

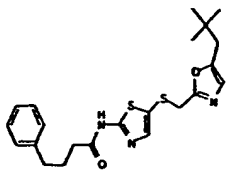
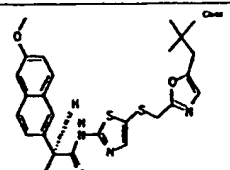
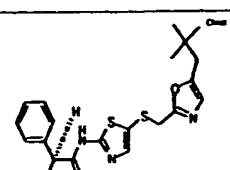
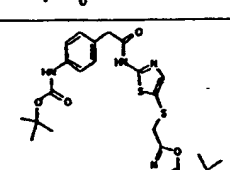
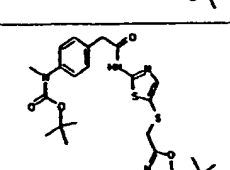
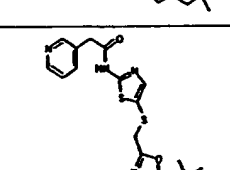
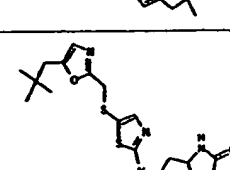
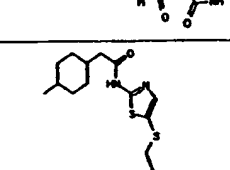
Example	Structure	Molecular Formula	(M+H) ⁺
499		C ₁₆ H ₂₁ N ₃ O ₂ S ₂	352
500		C ₁₄ H ₁₉ N ₃ O ₂ S ₂	326
501		C ₁₄ H ₁₉ N ₃ O ₂ S ₂	326
502		C ₁₇ H ₁₇ N ₃ O ₃ S ₂	376
503		C ₁₈ H ₁₉ N ₃ O ₃ S ₂	390
504		C ₁₄ H ₁₉ N ₃ O ₃ S ₂	342
505		C ₂₁ H ₃₁ N ₃ O ₃ S ₂	438
506		C ₁₀ H ₉ Br N ₄ O ₃ S ₂	378
507		C ₁₉ H ₂₂ N ₄ O ₃ S ₂	419
508		C ₁₈ H ₂₀ N ₄ O ₂ S ₂	389

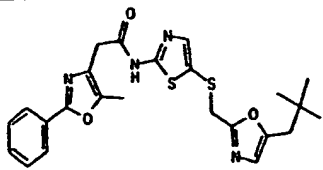
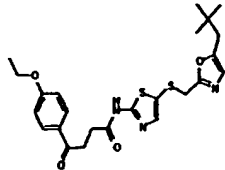
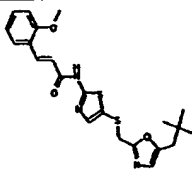
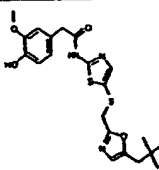
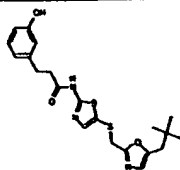
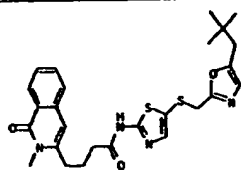
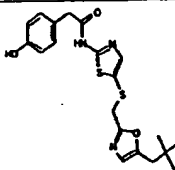
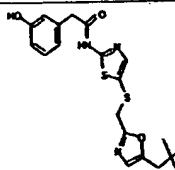
Example	Structure	Molecular Formula	(M+H) ⁺
509		C ₁₉ H ₂₂ N ₄ O ₂ S ₂	403
510		C ₁₉ H ₂₂ N ₄ O ₂ S ₂	403
511		C ₁₅ H ₂₁ N ₃ O ₃ S ₂	356
512		C ₂₃ H ₂₇ N ₃ O ₂ S ₂	442
513		C ₂₁ H ₂₉ N ₃ O ₂ S ₂	420
514		C ₂₄ H ₂₅ N ₃ O ₂ S ₂	452
515		C ₂₄ H ₂₅ N ₃ O ₂ S ₂	452
516		C ₁₇ H ₂₃ N ₃ O ₂ S ₂	366
517		C ₁₈ H ₂₇ N ₃ O ₂ S ₂	382

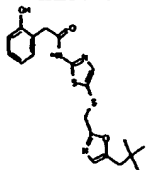
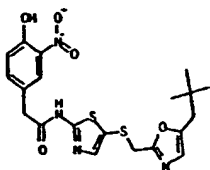
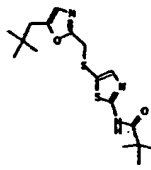
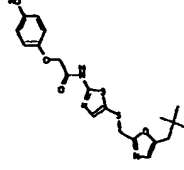
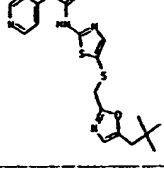
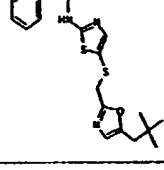
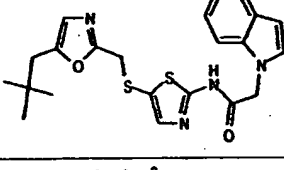
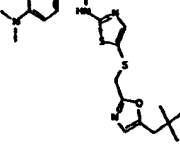
Example	Structure	Molecular Formula	(M+H) ⁺
518		C ₂₀ H ₂₃ N ₃ O ₂ S ₂	402
519		C ₂₀ H ₂₀ N ₄ O ₂ S ₂	413
520		C ₂₂ H ₂₇ N ₃ O ₂ S ₂	430
521		C ₂₀ H ₂₁ F ₂ N ₃ O ₂ S ₂	438
522		C ₂₃ H ₂₇ N ₃ O ₂ S ₂	442
523		C ₂₀ H ₂₀ N ₄ O ₂ S ₃	445
524		C ₂₁ H ₂₃ N ₃ O ₄ S ₂	446
525		C ₂₂ H ₂₇ N ₃ O ₃ S ₂	446

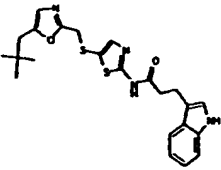
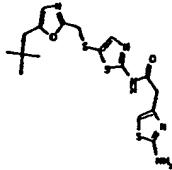
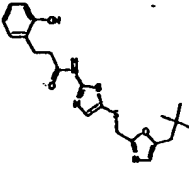
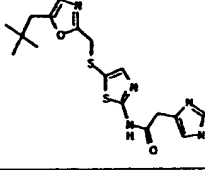
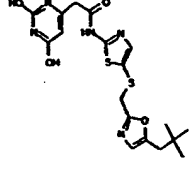
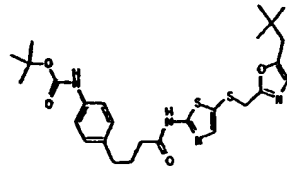
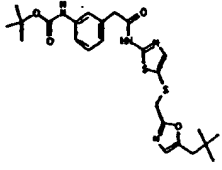
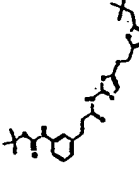
Example	Structure	Molecular Formula	(M+H) ⁺
526		C ₂₀ H ₂₂ N ₄ O ₄ S ₂	447
527		C ₂₀ H ₂₂ N ₄ O ₄ S ₂	447
528		C ₂₀ H ₂₂ N ₄ O ₄ S ₂	447
529		C ₂₁ H ₂₅ N ₃ O ₃ S ₂	432
530		C ₂₁ H ₂₅ N ₃ O ₄ S ₂	448
531		C ₂₀ H ₂₃ N ₅ O ₂ S ₃	462
532		C ₂₀ H ₂₃ N ₅ O ₂ S ₃	462
533		C ₂₁ H ₂₂ F ₃ N ₃ O ₂ S ₂	470
534		C ₂₀ H ₂₂ Br N ₃ O ₂ S ₂	481

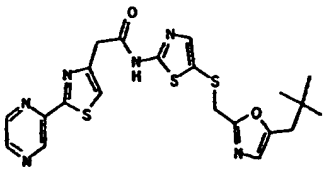
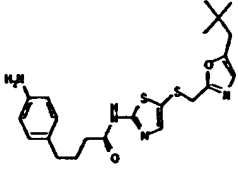
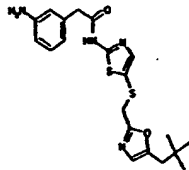
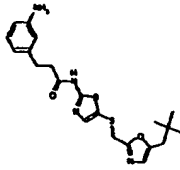
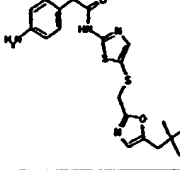
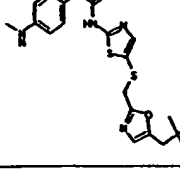
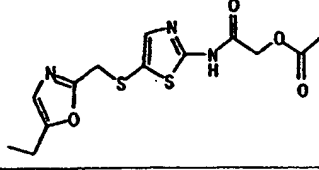
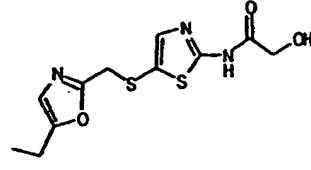
Example	Structure	Molecular Formula	(M+H) ⁺
535		C ₂₃ H ₂₉ N ₃ O ₅ S ₂	492
536		C ₂₁ H ₂₄ N ₄ O ₃ S ₂	445
537		C ₂₂ H ₂₅ N ₃ O ₄ S ₂	460
538		C ₂₀ H ₂₉ N ₃ O ₂ S ₂	408
539		C ₂₁ H ₂₅ N ₃ O ₂ S ₂	416
540		C ₂₉ H ₃₀ N ₄ O ₃ S ₂	547
541		C ₂₂ H ₂₇ N ₃ O ₃ S ₂	446
542		C ₂₀ H ₂₂ N ₄ O ₅ S ₂	463

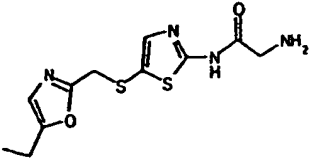
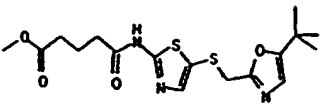
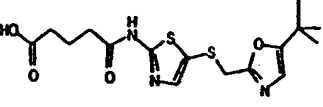
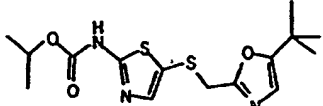
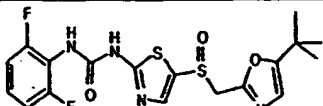
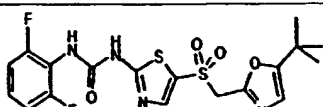
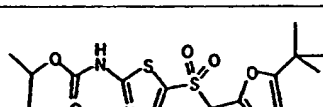
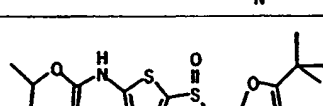
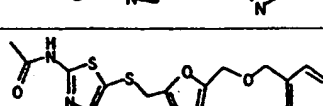
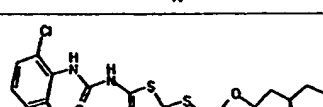
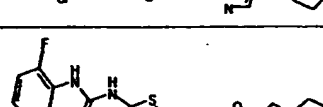
Example	Structure	Molecular Formula	(M+H) ⁺
543		C ₂₂ H ₂₇ N ₃ O ₂ S ₂	430
544		C ₂₆ H ₂₉ N ₃ O ₃ S ₂	496
545		C ₂₁ H ₂₅ N ₃ O ₂ S ₂	416
546		C ₂₅ H ₃₂ N ₄ O ₄ S ₂	517
547		C ₂₆ H ₃₄ N ₄ O ₄ S ₂	531
548		C ₁₉ H ₂₂ N ₄ O ₂ S ₂	517
549		C ₁₇ H ₂₁ N ₅ O ₄ S ₂	424
550		C ₂₁ H ₃₁ N ₃ O ₂ S ₂	422

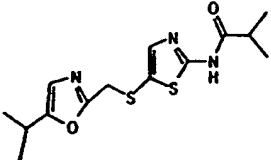
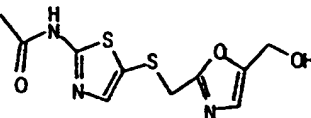
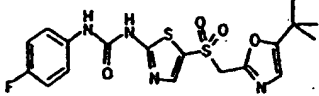
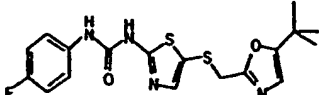
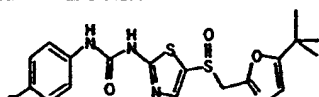
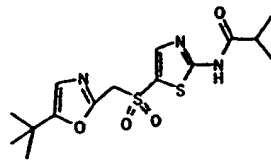
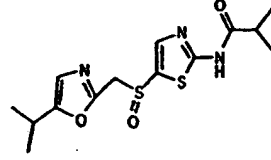
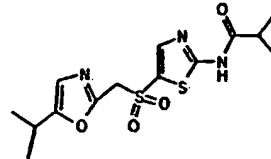
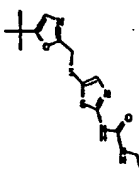
Example	Structure	Molecular Formula	(M+H) ⁺
551		C ₂₄ H ₂₆ N ₄ O ₃ S ₂	483
552		C ₂₄ H ₂₉ N ₃ O ₄ S ₂	488
553		C ₂₂ H ₂₅ N ₃ O ₃ S ₂	444
554		C ₂₁ H ₂₅ N ₃ O ₄ S ₂	448
555		C ₂₁ H ₂₅ N ₃ O ₃ S ₂	432
556		C ₂₆ H ₃₀ N ₄ O ₃ S ₂	511
557		C ₂₀ H ₂₃ N ₃ O ₃ S ₂	418
558		C ₂₀ H ₂₃ N ₃ O ₃ S ₂	418

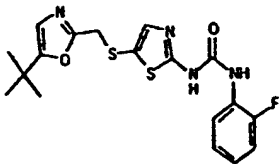
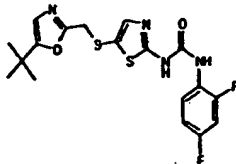
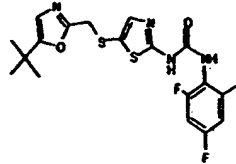
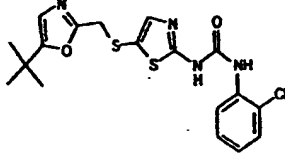
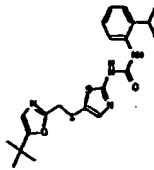
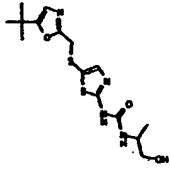
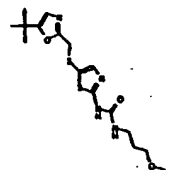
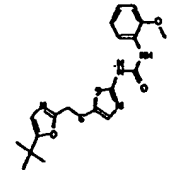
Example	Structure	Molecular Formula	(M+H) ⁺
559		C ₂₀ H ₂₃ N ₃ O ₃ S ₂	418
560		C ₂₀ H ₂₂ N ₄ O ₅ S ₂	463
561		C ₁₇ H ₂₅ N ₃ O ₂ S ₂	368
562		C ₂₀ H ₂₃ N ₃ O ₄ S ₂	434
563		C ₁₉ H ₂₂ N ₄ O ₂ S ₂	517
564		C ₁₉ H ₂₂ N ₄ O ₂ S ₂	517
565		C ₂₂ H ₂₄ N ₄ O ₂ S ₂	441
566		C ₂₂ H ₂₈ N ₄ O ₂ S ₂	559

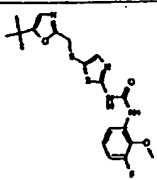
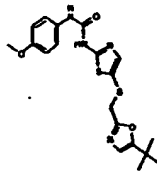
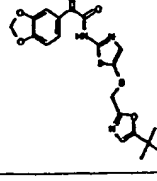
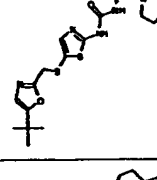
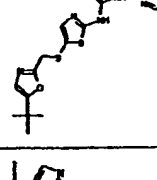
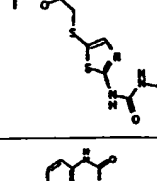
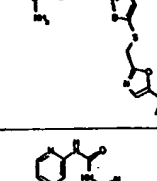
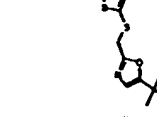
Example	Structure	Molecular Formula	(M+H)+
567		C ₂₃ H ₂₆ N ₄ O ₂ S ₂	569
568		C ₁₇ H ₂₁ N ₅ O ₂ S ₃	538
569		C ₂₁ H ₂₅ N ₃ O ₃ S ₂	432
570		C ₁₇ H ₂₁ N ₅ O ₂ S ₂	506
571		C ₁₈ H ₂₁ N ₅ O ₄ S ₂	436
572		C ₂₇ H ₃₆ N ₄ O ₄ S ₂	545
573		C ₂₅ H ₃₂ N ₄ O ₄ S ₂	517
574		C ₂₆ H ₃₄ N ₄ O ₄ S ₂	531

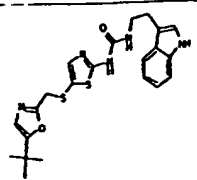
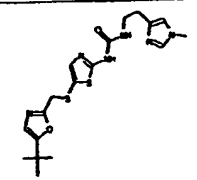
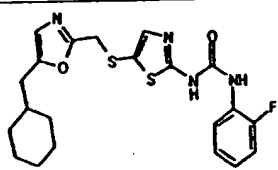
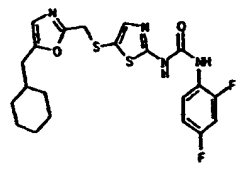
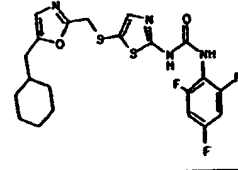
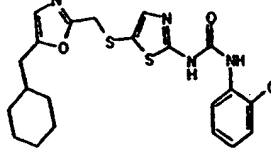
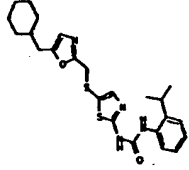
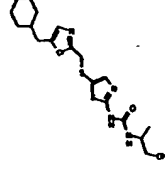
Example	Structure	Molecular Formula	(M+H) ⁺
575		C ₂₁ H ₂₂ N ₆ O ₂ S ₃	487
576		C ₂₂ H ₂₈ N ₄ O ₂ S ₂	559
577		C ₂₀ H ₂₄ N ₄ O ₂ S ₂	531
578		C ₂₁ H ₂₆ N ₄ O ₂ S ₂	545
579		C ₂₀ H ₂₄ N ₄ O ₂ S ₂	531
580		C ₂₁ H ₂₆ N ₄ O ₂ S ₂	545
581		C ₁₃ H ₁₅ N ₃ O ₄ S ₂	342
582		C ₁₁ H ₁₃ N ₃ O ₃ S ₂	300

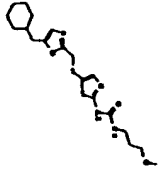
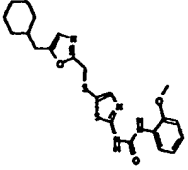
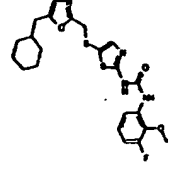
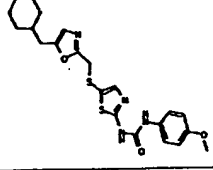
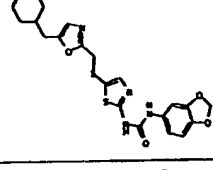
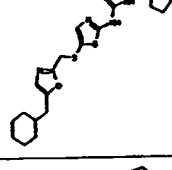
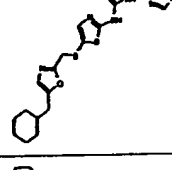
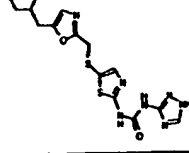
Example	Structure	Molecular Formula	(M+H)+
583		C ₁₁ H ₁₄ N ₄ O ₂ S ₂	413
584		C ₁₇ H ₂₃ N ₃ O ₄ S ₂	398
585		C ₁₆ H ₂₁ N ₃ O ₄ S ₂	384
586		C ₁₅ H ₂₁ N ₃ O ₃ S ₂	356
587		C ₁₈ H ₁₈ F ₂ N ₄ O ₃ S ₂	441
588		C ₁₈ H ₁₈ F ₂ N ₄ O ₄ S ₂	457
589		C ₁₅ H ₂₁ N ₃ O ₅ S ₂	388
590		C ₁₅ H ₂₁ N ₃ O ₄ S ₂	372
591		C ₁₇ H ₁₇ N ₃ O ₃ S ₂	376
592		C ₂₁ H ₂₂ Cl ₂ N ₄ O ₂ S ₂	498
593		C ₂₁ H ₂₂ F ₂ N ₄ O ₂ S ₂	465

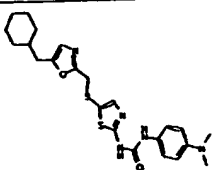
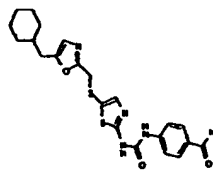
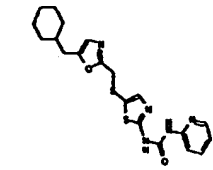
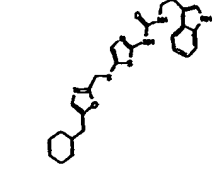
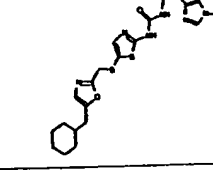
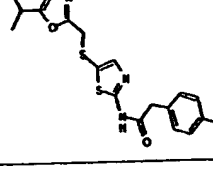
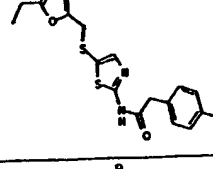
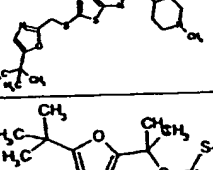
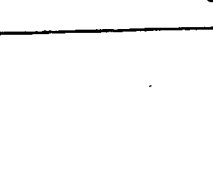
Example	Structure	Molecular Formula	(M+H) ⁺
594		C ₁₄ H ₁₉ N ₃ O ₂ S ₂	326
595		C ₁₀ H ₁₁ N ₃ O ₃ S ₂	286
596		C ₁₈ H ₁₉ F N ₄ O ₄ S ₂	439
597		C ₁₈ H ₁₉ F N ₄ O ₂ S ₂	407
598		C ₁₈ H ₁₉ F N ₄ O ₃ S ₂	423
599		C ₁₅ H ₂₁ N ₃ O ₄ S ₂	372
600		C ₁₄ H ₁₉ N ₃ O ₃ S ₂	342
601		C ₁₄ H ₁₉ N ₃ O ₄ S ₂	358
602		C ₁₄ H ₂₀ N ₄ O ₂ S ₂	341

Example	Structure	Molecular Formula	(M+H) ⁺
603		C ₁₈ H ₁₉ F N ₄ O ₂ S ₂	407
604		C ₁₈ H ₁₈ F ₂ N ₄ O ₂ S ₂	425
605		C ₁₈ H ₁₇ F ₃ N ₄ O ₂ S ₂	443
606		C ₁₈ H ₁₉ Cl N ₄ O ₂ S ₂	423
607		C ₂₁ H ₂₆ N ₄ O ₂ S ₂	431
608		C ₁₅ H ₂₂ N ₄ O ₃ S ₂	371
609		C ₁₆ H ₂₄ N ₄ O ₃ S ₂	385
610		C ₁₉ H ₂₂ N ₄ O ₃ S ₂	419

Example	Structure	Molecular Formula	(M+H) ⁺
611		C ₁₉ H ₂₁ F N ₄ O ₃ S ₂	437
612		C ₁₉ H ₂₂ N ₄ O ₃ S ₂	419
613		C ₁₉ H ₂₀ N ₄ O ₄ S ₂	433
614		C ₁₈ H ₂₇ N ₅ O ₂ S ₂	524
615		C ₁₇ H ₂₂ N ₆ O ₂ S ₂	521
616		C ₁₄ H ₁₇ N ₇ O ₂ S ₂	494
617		C ₁₉ H ₂₁ N ₅ O ₃ S ₂	432
618		C ₁₇ H ₁₉ N ₅ O ₂ S ₂	504

Example	Structure	Molecular Formula	(M+H) ⁺
619		C ₂₂ H ₂₅ N ₅ O ₂ S ₂	456
620		C ₁₈ H ₂₄ N ₆ O ₂ S ₂	535
621		C ₂₁ H ₂₃ F N ₄ O ₂ S ₂	447
622		C ₂₁ H ₂₂ F ₂ N ₄ O ₂ S ₂	465
623		C ₂₁ H ₂₁ F ₃ N ₄ O ₂ S ₂	483
624		C ₂₁ H ₂₃ Cl N ₄ O ₂ S ₂	464
625		C ₂₄ H ₃₀ N ₄ O ₂ S ₂	471
626		C ₁₈ H ₂₆ N ₄ O ₃ S ₂	411

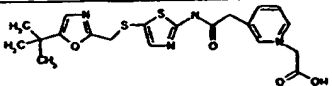
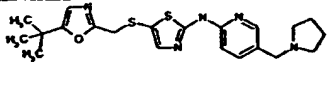
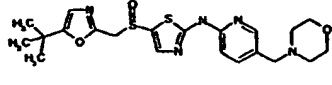
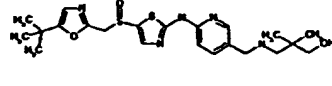
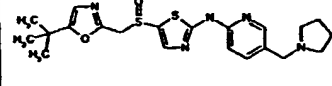
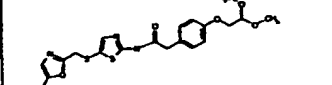
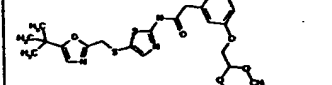
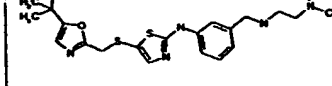
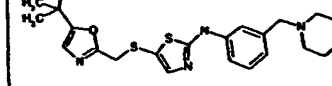
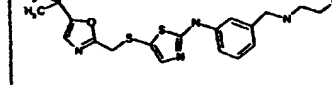
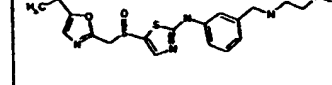
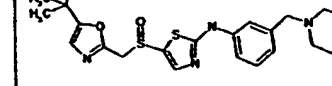
Example	Structure	Molecular Formula	(M+H) ⁺
627		C ₁₉ H ₂₈ N ₄ O ₃ S ₂	425
628		C ₂₂ H ₂₆ N ₄ O ₃ S ₂	459
629		C ₂₂ H ₂₅ F N ₄ O ₃ S ₂	477
630		C ₂₂ H ₂₆ N ₄ O ₃ S ₂	459
631		C ₂₂ H ₂₄ N ₄ O ₄ S ₂	473
632		C ₂₁ H ₃₁ N ₅ O ₂ S ₂	564
633		C ₂₀ H ₂₆ N ₆ O ₂ S ₂	561
634		C ₁₇ H ₂₁ N ₇ O ₂ S ₂	534

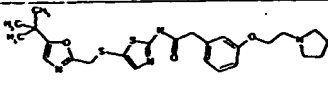
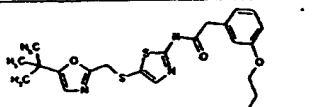
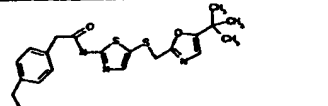
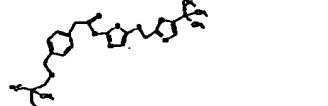
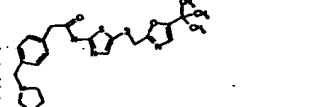
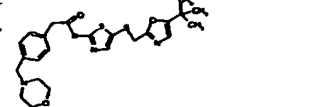
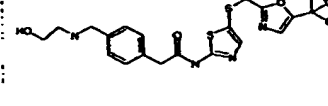
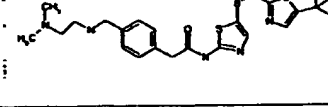
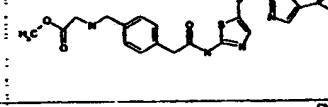
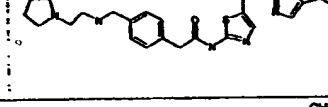
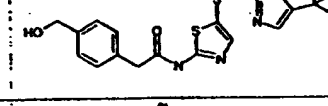
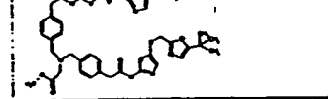
Example	Structure	Molecular Formula	(M+H) ⁺
635		C ₂₃ H ₂₉ N ₅ O ₂ S ₂	586
636		C ₂₂ H ₂₅ N ₅ O ₃ S ₂	472
637		C ₂₀ H ₂₃ N ₅ O ₂ S ₂	544
638		C ₂₅ H ₂₉ N ₅ O ₂ S ₂	496
639		C ₂₁ H ₂₈ N ₆ O ₂ S ₂	575
640		C ₂₄ H ₃₃ N ₃ O ₃ S ₂ Si	504
641		C ₂₃ H ₂₈ N ₄ O ₄ S ₂	489
642		C ₁₉ H ₂₈ N ₄ O ₂ S ₂	409
643		C ₁₅ H ₂₁ N ₃ O ₂ S ₂	340

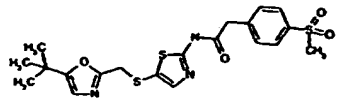
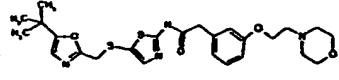
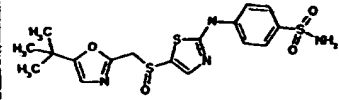
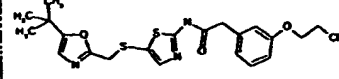
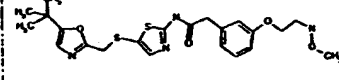
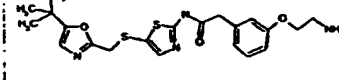
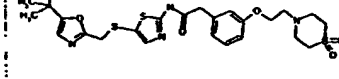
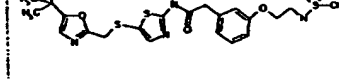
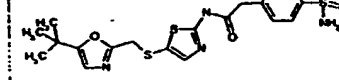

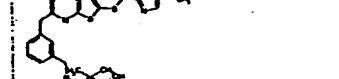
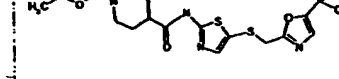
Example	Structure	Molecular Formula	(M+H) ⁺
644		C ₁₇ H ₂₃ N ₃ O ₂ S ₂	367
645		C ₂₄ H ₃₁ N ₅ O ₂ S ₂	487
646		C ₁₉ H ₂₈ N ₄ O ₂ S ₂	410
647		C ₁₉ H ₂₈ N ₄ O ₂ S ₂	410
648		C ₁₈ H ₂₇ N ₅ O ₂ S ₂	411
649		C ₁₆ H ₁₉ N ₅ O ₂ S ₂	378
650		C ₁₆ H ₁₈ N ₄ O S ₂	347
651		C ₁₇ H ₁₉ N ₃ O S ₂	346
652		C ₁₉ H ₂₂ N ₄ O ₂ S ₂	404
653		C ₁₉ H ₂₂ N ₄ O ₂ S ₂	404
654		C ₂₅ H ₃₂ N ₄ O ₃ S ₂	502
655		C ₂₀ H ₂₄ N ₄ O ₂ S ₂	418

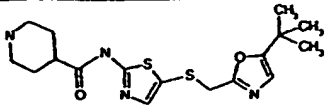
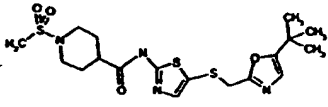
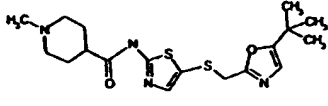
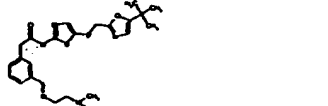
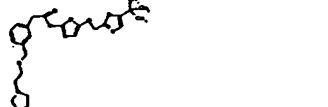



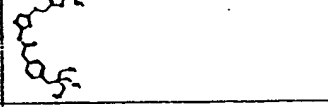
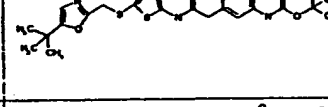
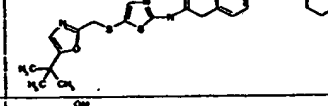
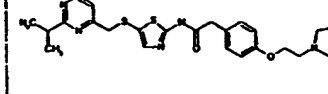
Example	Structure	Molecular Formula	(M+H) ⁺
656		C ₁₉ H ₂₃ N ₄ O ₂ S ₂	405
657		C ₁₈ H ₂₀ N ₄ O ₃ S ₂	406
658		C ₁₆ H ₁₈ N ₄ O ₃ S ₂	379
659		C ₁₆ H ₁₈ N ₄ O ₂ S ₂	363
660		C ₁₆ H ₁₇ Br N ₄ O S ₂	426
661		C ₁₉ H ₂₃ N ₃ O ₃ S ₂	407
662		C ₂₁ H ₃₀ N ₆ O S ₂	448
663		C ₁₉ H ₂₅ N ₅ O ₂ S ₂	421
664		C ₁₇ H ₁₈ N ₄ O ₂ S ₂	375
665		C ₂₄ H ₃₁ N ₅ O ₃ S ₂	503
666		C ₂₁ H ₂₆ N ₄ O ₃ S ₂	448
667		C ₁₇ H ₂₀ N ₄ O ₂ S ₂	378

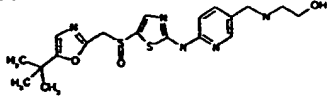
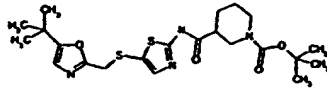
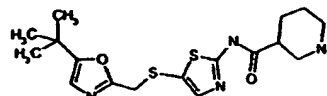
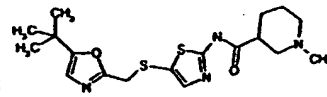
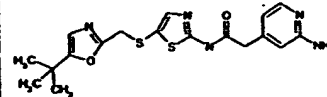
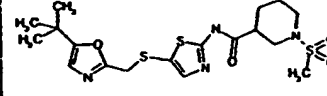
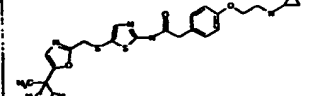
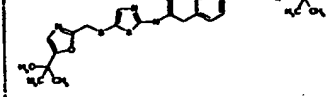
Example	Structure	Molecular Formula	(M+H)+
668		C ₂₁ H ₂₇ N ₅ O ₃ S ₂	463
669		C ₁₉ H ₂₃ N ₅ O ₃ S ₂	435
670		C ₁₅ H ₁₇ N ₅ O ₂ S ₂	364
671		C ₁₉ H ₂₂ N ₄ O ₂ S ₂	404
672		C ₁₃ H ₁₁ N ₅ S ₂	302
673		C ₁₄ H ₁₂ N ₄ S ₂	301
674		C ₁₇ H ₁₈ N ₄ S ₂	343
675		C ₁₇ H ₁₈ N ₄ S ₂	343
676		C ₁₅ H ₁₄ N ₄ S ₂	315
677		C ₁₆ H ₁₈ N ₄ O ₂ S ₂	363
678		C ₁₆ H ₁₈ N ₄ O ₂ S ₂	363
679		C ₂₂ H ₃₁ N ₅ O ₂ S ₂	463

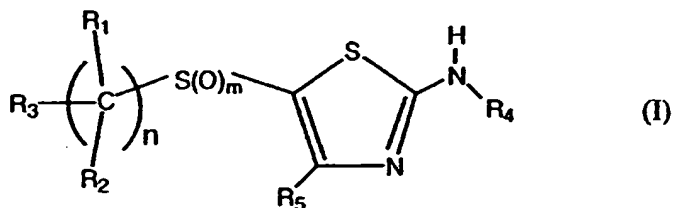
Example	Structure	Molecular Formula	(M+H) ⁺
680		C ₂₀ H ₂₄ N ₄ O ₄ S ₂	450
681		C ₂₁ H ₂₇ N ₅ O S ₂	431
682		C ₂₁ H ₂₇ N ₅ O ₃ S ₂	463
683		C ₂₂ H ₃₁ N ₅ O ₃ S ₂	479
684		C ₂₁ H ₂₇ N ₅ O ₂ S ₂	447
685		C ₂₃ H ₂₉ N ₃ O ₅ S ₂	493
686		C ₂₃ H ₂₉ N ₃ O ₅ S ₂	493
687		C ₂₂ H ₃₁ N ₅ O S ₂	447
688		C ₂₂ H ₂₈ N ₄ O ₂ S ₂	446
689		C ₂₀ H ₂₆ N ₄ O ₂ S ₂	420
690		C ₂₂ H ₃₁ N ₅ O ₂ S ₂	463
691		C ₂₂ H ₂₈ N ₄ O ₃ S ₂	462

Example	Structure	Molecular Formula	(M+H)+
692		C ₂₅ H ₃₂ N ₄ O ₃ S ₂	502
693		C ₂₁ H ₂₅ N ₃ O ₄ S ₂	449
694		C ₂₀ H ₂₄ N ₄ O ₂ S ₂	418
695		C ₂₅ H ₃₄ N ₄ O ₃ S ₂	504
696		C ₂₄ H ₃₀ N ₄ O ₂ S ₂	472
697		C ₂₄ H ₃₀ N ₄ O ₃ S ₂	488
698		C ₂₂ H ₂₈ N ₄ O ₃ S ₂	462
699		C ₂₄ H ₃₃ N ₅ O ₂ S ₂	489
700		C ₂₃ H ₂₈ N ₄ O ₄ S ₂	490
701		C ₂₆ H ₃₅ N ₅ O ₂ S ₂	515
702		C ₂₀ H ₂₃ N ₃ O ₃ S ₂	419
703		C ₄₃ H ₄₉ N ₇ O ₆ S ₄	889

Example	Structure	Molecular Formula	(M+H)+
704		C ₂₀ H ₂₃ N ₃ O ₄ S ₃	467
705		C ₂₅ H ₃₂ N ₄ O ₄ S ₂	518
706		C ₁₇ H ₂₀ N ₄ O ₄ S ₃	442
707		C ₂₁ H ₂₄ Cl N ₃ O ₃ S ₂	467
708		C ₂₂ H ₂₈ N ₄ O ₄ S ₂	478
709		C ₂₁ H ₂₆ N ₄ O ₃ S ₂	448
710		C ₂₅ H ₃₂ N ₄ O ₅ S ₃	566
711		C ₂₂ H ₂₈ N ₄ O ₅ S ₃	526
712		C ₁₉ H ₂₂ N ₄ O ₄ S ₃	468
713		C ₂₂ H ₂₈ N ₄ O ₃ S ₂	462
714		C ₂₅ H ₃₄ N ₄ O ₃ S ₂	504
715		C ₂₂ H ₃₂ N ₄ O ₄ S ₂	482

Example	Structure	Molecular Formula	(M+H) ⁺
716		C ₁₇ H ₂₄ N ₄ O ₂ S ₂	382
717		C ₁₈ H ₂₆ N ₄ O ₄ S ₃	460
718		C ₁₈ H ₂₆ N ₄ O ₂ S ₂	396
719		C ₂₄ H ₃₃ N ₅ O ₂ S ₂	489
720		C ₂₆ H ₃₅ N ₅ O ₂ S ₂	515
721		C ₂₄ H ₃₀ N ₄ O ₂ S ₂	472
722		C ₂₀ H ₂₄ N ₄ O ₂ S ₂	418
723		C ₂₄ H ₃₀ N ₄ O ₃ S ₂	488
724		C ₂₆ H ₃₈ N ₄ O ₂ S ₂	504
725		C ₂₃ H ₂₉ N ₅ O ₄ S ₂	505
726		C ₂₅ H ₃₂ N ₄ O ₄ S ₂	518
727		C ₂₅ H ₃₁ N ₅ O ₃ S ₂	515

Example	Structure	Molecular Formula	(M+H) ⁺
728		C ₁₉ H ₂₅ N ₅ O ₃ S ₂	437
729		C ₂₂ H ₃₂ N ₄ O ₄ S ₂	482
730		C ₁₇ H ₂₄ N ₄ O ₂ S ₂	382
731		C ₁₈ H ₂₆ N ₄ O ₂ S ₂	396
732		C ₁₈ H ₂₁ N ₅ O ₂ S ₂	405
733		C ₁₈ H ₂₆ N ₄ O ₄ S ₃	460
734		C ₂₄ H ₃₀ N ₄ O ₃ S ₂	488
735		C ₂₆ H ₃₆ N ₄ O ₄ S ₂	534

What is Claimed is:**1. A compound of the formula**

and pharmaceutically acceptable salts thereof wherein:

R_1 and R_2 are independently hydrogen, fluorine or alkyl;

R_3 is aryl or heteroaryl;

R_4 is alkyl, cycloalkyl, aryl, cycloalkylalkyl, arylalkyl, heteroaryl,

10 heteroarylalkyl, heterocycloalkyl,

heterocycloalkylalkyl; or

CO-alkyl, CO-cycloalkyl, CO-aryl, CO-alkyl-cycloalkyl, CO-alkyl-aryl,

CO-heteroaryl, CO-alkyl-heteroaryl, CO-heterocycloalkyl,

CO-alkyl-heterocycloalkyl; or

15 CONH-alkyl, CONH-cycloalkyl, CONH-aryl, CONH-alkyl-cycloalkyl,

CONH-alkyl-aryl, CONH-heteroaryl,

CONH-alkyl-heteroaryl, CONH-heterocycloalkyl,

CONH-alkyl-heterocycloalkyl; or

COO-alkyl, COO-cycloalkyl, COO-aryl, COO-alkyl-cycloalkyl,

20 COO-alkyl-aryl, COO-heteroaryl, COO-alkyl-heteroaryl,

COO-heterocycloalkyl, COO-alkyl-heterocycloalkyl; or

SO₂-cycloalkyl, SO₂-aryl, SO₂-alkyl-cycloalkyl, SO₂-alkyl-aryl,

SO₂-heteroaryl, SO₂-alkyl-heteroaryl, SO₂-heterocycloalkyl,

SO₂-alkyl-heterocycloalkyl; or

25 C(NCN)NH-alkyl, C(NCN)NH-cycloalkyl, C(NCN)NH-aryl,

C(NC(NH))-alkyl-cycloalkyl, C(NCN)NH-alkyl-aryl,

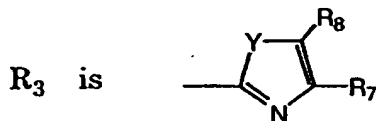
C(NCN)NH-heteroaryl, C(NCN)NH-alkyl-heteroaryl,

C(NCN)NH-heterocycloalkyl, C(NCN)NH-alkyl-heterocycloalkyl; or

- C(NNO₂)NH-alkyl, C(NNO₂)NH-cycloalkyl, C(NNO₂)NH-aryl,
 C(NNO₂)NH-alkyl-cycloalkyl, C(NNO₂)NH-alkyl-aryl,
 C(NNO₂)NH-heteroaryl, C(NNO₂)NH-alkyl-heteroaryl,
 C(NNO₂)NH-heterocycloalkyl, C(NNO₂)NH-alkyl-heterocycloalkyl;
 5 or
 C(NH)NH-alkyl, C(NH)NH-cycloalkyl, C(NH)NH-aryl,
 C(NH)NH-alkyl-cycloalkyl, C(NH)NH-alkyl-aryl,
 C(NH)NH-heteroaryl, C(NH)NH-alkyl-heteroaryl,
 C(NH)NH-heterocycloalkyl, C(NH)NH-alkyl-heterocycloalkyl; or
 10 C(NH)NHCO-alkyl, C(NH)NHCO-cycloalkyl, C(NH)NHCO-aryl,
 C(NH)NHCO-alkyl-cycloalkyl, C(NH)NHCO-alkyl-aryl,
 C(NH)NHCO-heteroaryl, C(NH)NHCO-alkyl-heteroaryl,
 C(NH)NHCO-heterocycloalkyl,
 C(NH)NHCO-alkyl-heterocycloalkyl; or
 15 C(NOR₆)NH-alkyl, C(NOR₆)NH-cycloalkyl, C(NOR₆)NH-aryl,
 C(NOR₆)NH-alkyl-cycloalkyl, C(NOR₆)NH-alkyl-aryl,
 C(NOR₆)NH-heteroaryl, C(NOR₆)NH-alkyl-heteroaryl,
 C(NOR₆)NH-heterocycloalkyl, C(NOR₆)NH-alkyl-heterocycloalkyl;
 R₅ is hydrogen or alkyl;
 20 R₆ is hydrogen, alkyl, cycloalkyl, aryl, cycloalkylalkyl, arylalkyl,
 heteroaryl, heteroarylalkyl, heterocycloalkyl or heterocycloalkylalkyl;
 m is an integer of 0 to 2; and
 n is an integer of 1 to 3.

- 25 2. The compounds as recited in Claim 1, wherein

R₁ and R₂ are independently hydrogen, fluorine or alkyl;



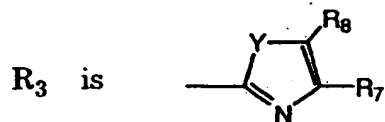
wherein Y is oxygen, sulfur or NR₉

- R_4 is alkyl, cycloalkyl, aryl, cycloalkylalkyl, arylalkyl, heteroaryl,
 heteroarylalkyl, heterocycloalkyl,
 heterocycloalkylalkyl; or
 CO-alkyl, CO-cycloalkyl, CO-aryl, CO-alkyl-cycloalkyl, CO-alkyl-aryl,
 5 CO-heteroaryl, CO-alkyl-heteroaryl, CO-heterocycloalkyl,
 CO-alkyl-heterocycloalkyl; or
 CONH-alkyl, CONH-cycloalkyl, CONH-aryl, CONH-alkyl-cycloalkyl,
 CONH-alkyl-aryl, CONH-heteroaryl,
 CONH-alkyl-heteroaryl, CONH-heterocycloalkyl,
 10 CONH-alkyl-heterocycloalkyl; or
 COO-alkyl, COO-cycloalkyl, COO-aryl, COO-alkyl-cycloalkyl,
 COO-alkyl-aryl, COO-heteroaryl, COO-alkyl-heteroaryl,
 COO-heterocycloalkyl, COO-alkyl-heterocycloalkyl; or
 SO₂-cycloalkyl, SO₂-aryl, SO₂-alkyl-cycloalkyl, SO₂-alkyl-aryl,
 15 SO₂-heteroaryl, SO₂-alkyl-heteroaryl, SO₂-heterocycloalkyl,
 SO₂-alkyl-heterocycloalkyl; or
 C(NCN)NH-alkyl, C(NCN)NH-cycloalkyl, C(NCN)NH-aryl,
 C(NC(NH))-alkyl-cycloalkyl, C(NCN)NH-alkyl-aryl,
 C(NCN)NH-heteroaryl, C(NCN)NH-alkyl-heteroaryl,
 20 C(NCN)NH-heterocycloalkyl, C(NCN)NH-alkyl-heterocycloalkyl; or
 C(NNO₂)NH-alkyl, C(NNO₂)NH-cycloalkyl, C(NNO₂)NH-aryl,
 C(NNO₂)NH-alkyl-cycloalkyl, C(NNO₂)NH-alkyl-aryl,
 C(NNO₂)NH-heteroaryl, C(NNO₂)NH-alkyl-heteroaryl,
 C(NNO₂)NH-heterocycloalkyl, C(NNO₂)NH-alkyl-heterocycloalkyl;
 25 or
 C(NH)NH-alkyl, C(NH)NH-cycloalkyl, C(NH)NH-aryl,
 C(NH)NH-alkyl-cycloalkyl, C(NH)NH-alkyl-aryl,
 C(NH)NH-heteroaryl, C(NH)NH-alkyl-heteroaryl,
 C(NH)NH-heterocycloalkyl, C(NH)NH-alkyl-heterocycloalkyl; or
 30 C(NH)NHCO-alkyl, C(NH)NHCO-cycloalkyl, C(NH)NHCO-aryl,
 C(NH)NHCO-alkyl-cycloalkyl, C(NH)NHCO-alkyl-aryl,

- C(NH)NHCO-heteroaryl, C(NH)NHCO-alkyl-heteroaryl,
 C(NH)NHCO-heterocycloalkyl,
 C(NH)NHCO-alkyl-heterocycloalkyl; or
 C(NOR₆)NH-alkyl, C(NOR₆)NH-cycloalkyl, C(NOR₆)NH-aryl,
 5 C(NOR₆)NH-alkyl-cycloalkyl, C(NOR₆)NH-alkyl-aryl,
 C(NOR₆)NH-heteroaryl, C(NOR₆)NH-alkyl-heteroaryl,
 C(NOR₆)NH-heterocycloalkyl, C(NOR₆)NH-alkyl-heterocycloalkyl;
 R₅ is hydrogen or alkyl;
 R₆ is hydrogen, alkyl, cycloalkyl, aryl, cycloalkylalkyl, arylalkyl,
 10 heteroaryl, heteroarylalkyl, heterocycloalkyl or heterocycloalkylalkyl;
 R₇ and R₈ are independently hydrogen, alkyl, substituted alkyl,
 cycloalkyl, aryl, substituted aryl, cycloalkylalkyl, arylalkyl, heteroaryl,
 substituted heteroaryl, heteroarylalkyl, heterocycloalkyl,
 heterocycloalkylalkyl;
 15 R₉ is hydrogen, alkyl, cycloalkyl, aryl, alkylcycloalkyl, arylalkyl,
 heteroaryl, heteroarylalkyl, heterocycloalkyl or heterocycloalkylalkyl;
 m is an integer of 0 to 2; and
 n is an integer of 1 to 3.

- 20 3. The compounds as recited in Claim 1, wherein

R₁ and R₂ are independently hydrogen, fluorine or alkyl;-



wherein Y is oxygen;

- R₄ is alkyl, cycloalkyl, aryl, cycloalkylalkyl, arylalkyl, heteroaryl,
 25 heteroarylalkyl, heterocycloalkyl,
 heterocycloalkylalkyl; or
 CO-alkyl, CO-cycloalkyl, CO-aryl, CO-alkyl-cycloalkyl, CO-alkyl-aryl,
 CO-heteroaryl, CO-alkyl-heteroaryl, CO-heterocycloalkyl,
 CO-alkyl-heterocycloalkyl; or

- CONH-alkyl, CONH-cycloalkyl, CONH-aryl, CONH-alkyl-cycloalkyl,
 CONH-alkyl-aryl, CONH-heteroaryl,
 CONH-alkyl-heteroaryl, CONH-heterocycloalkyl,
 CONH-alkyl-heterocycloalkyl; or
- 5 COO-alkyl, COO-cycloalkyl, COO-aryl, COO-alkyl-cycloalkyl,
 COO-alkyl-aryl, COO-heteroaryl, COO-alkyl-heteroaryl,
 COO-heterocycloalkyl, COO-alkyl-heterocycloalkyl; or
- SO₂-cycloalkyl, SO₂-aryl, SO₂-alkyl-cycloalkyl, SO₂-alkyl-aryl, SO₂-
 heteroaryl, SO₂-alkyl-heteroaryl, SO₂-heterocycloalkyl, SO₂-alkyl-
 10 heterocycloalkyl; or
- C(NCN)NH-alkyl, C(NCN)NH-cycloalkyl, C(NCN)NH-aryl,
 C(NC₂NNH)-alkyl-cycloalkyl, C(NCN)NH-alkyl-aryl,
 C(NCN)NH-heteroaryl, C(NCN)NH-alkyl-heteroaryl,
 C(NCN)NH-heterocycloalkyl, C(NCN)NH-alkyl-heterocycloalkyl; or
- 15 C(NNO₂)NH-alkyl, C(NNO₂)NH-cycloalkyl, C(NNO₂)NH-aryl,
 C(NNO₂)NH-alkyl-cycloalkyl, C(NNO₂)NH-alkyl-aryl,
 C(NNO₂)NH-heteroaryl, C(NNO₂)NH-alkyl-heteroaryl,
 C(NNO₂)NH-heterocycloalkyl, C(NNO₂)NH-alkyl-heterocycloalkyl;
- or
- 20 C(NH)NH-alkyl, C(NH)NH-cycloalkyl, C(NH)NH-aryl,
 C(NH)NH-alkyl-cycloalkyl, C(NH)NH-alkyl-aryl,
 C(NH)NH-heteroaryl, C(NH)NH-alkyl-heteroaryl,
 C(NH)NH-heterocycloalkyl, C(NH)NH-alkyl-heterocycloalkyl; or
- C(NH)NHCO-alkyl, C(NH)NHCO-cycloalkyl, C(NH)NHCO-aryl,
 25 C(NH)NHCO-alkyl-cycloalkyl, C(NH)NHCO-alkyl-aryl,
 C(NH)NHCO-heteroaryl, C(NH)NHCO-alkyl-heteroaryl,
 C(NH)NHCO-heterocycloalkyl,
 C(NH)NHCO-alkyl-heterocycloalkyl; or
- C(NOR₆)NH-alkyl, C(NOR₆)NH-cycloalkyl, C(NOR₆)NH-aryl,
 30 C(NOR₆)NH-alkyl-cycloalkyl, C(NOR₆)NH-alkyl-aryl,
 C(NOR₆)NH-heteroaryl, C(NOR₆)NH-alkyl-heteroaryl,

C(NOR₆)NH-heterocycloalkyl, C(NOR₆)NH-alkyl-heterocycloalkyl;

R₅ is hydrogen;

R₆ is hydrogen, alkyl, cycloalkyl, aryl, cycloalkylalkyl, arylalkyl, heteroaryl, heteroarylalkyl, heterocycloalkyl or heterocycloalkylalkyl;

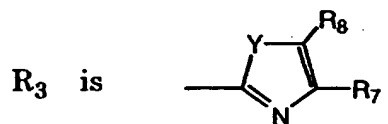
5 R₇ and R₈ are independently hydrogen, alkyl, substituted alkyl, cycloalkyl, aryl, substituted aryl, cycloalkylalkyl, arylalkyl, heteroaryl, substituted heteroaryl, heteroarylalkyl, heterocycloalkyl, heterocycloalkylalkyl;

m is an integer of 0 to 2; and

10 n is an integer of 1 to 3.

4. The compounds as recited in Claim 1, wherein

R₁ and R₂ are independently hydrogen, fluorine or alkyl;



15 wherein Y is sulfur;

R₄ is hydrogen, alkyl, cycloalkyl, aryl, cycloalkylalkyl, arylalkyl, heteroaryl, heteroarylalkyl, heterocycloalkyl,

heterocycloalkylalkyl; or

CO-alkyl, CO-cycloalkyl, CO-aryl, CO-alkyl-cycloalkyl, CO-alkyl-aryl,

20 CO-heteroaryl, CO-alkyl-heteroaryl, CO-heterocycloalkyl,

CO-alkyl-heterocycloalkyl; or

CONH-alkyl, CONH-cycloalkyl, CONH-aryl, CONH-alkyl-cycloalkyl,

CONH-alkyl-aryl, CONH-heteroaryl,

CONH-alkyl-heteroaryl, CONH-heterocycloalkyl,

25 CONH-alkyl-heterocycloalkyl; or

COO-alkyl, COO-cycloalkyl, COO-aryl, COO-alkyl-cycloalkyl,

COO-alkyl-aryl, COO-heteroaryl, COO-alkyl-heteroaryl,

COO-heterocycloalkyl, COO-alkyl-heterocycloalkyl; or

SO₂-cycloalkyl, SO₂-aryl, SO₂-alkyl-cycloalkyl, SO₂-alkyl-aryl,

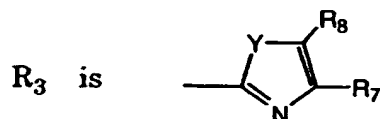
- SO₂-heteroaryl, SO₂-alkyl-heteroaryl, SO₂-heterocycloalkyl,
 SO₂-alkyl-heterocycloalkyl; or
- C(NCN)NH-alkyl, C(NCN)NH-cycloalkyl, C(NCN)NH-aryl,
 C(NC₂NNH)-alkyl-cycloalkyl, C(NCN)NH-alkyl-aryl,
 5 C(NCN)NH-heteroaryl, C(NCN)NH-alkyl-heteroaryl,
 C(NCN)NH-heterocycloalkyl, C(NCN)NH-alkyl-heterocycloalkyl; or
- C(NNO₂)NH-alkyl, C(NNO₂)NH-cycloalkyl, C(NNO₂)NH-aryl,
 C(NNO₂)NH-alkyl-cycloalkyl, C(NNO₂)NH-alkyl-aryl,
 C(NNO₂)NH-heteroaryl, C(NNO₂)NH-alkyl-heteroaryl,
 10 C(NNO₂)NH-heterocycloalkyl, C(NNO₂)NH-alkyl-heterocycloalkyl;
 or
- C(NH)NH-alkyl, C(NH)NH-cycloalkyl, C(NH)NH-aryl,
 C(NH)NH-alkyl-cycloalkyl, C(NH)NH-alkyl-aryl,
 C(NH)NH-heteroaryl, C(NH)NH-alkyl-heteroaryl,
 15 C(NH)NH-heterocycloalkyl, C(NH)NH-alkyl-heterocycloalkyl; or
- C(NH)NHCO-alkyl, C(NH)NHCO-cycloalkyl, C(NH)NHCO-aryl,
 C(NH)NHCO-alkyl-cycloalkyl, C(NH)NHCO-alkyl-aryl,
 C(NH)NHCO-heteroaryl, C(NH)NHCO-alkyl-heteroaryl,
 C(NH)NHCO-heterocycloalkyl,
 20 C(NH)NHCO-alkyl-heterocycloalkyl; or
- C(NOR₆)NH-alkyl, C(NOR₆)NH-cycloalkyl, C(NOR₆)NH-aryl,
 C(NOR₆)NH-alkyl-cycloalkyl, C(NOR₆)NH-alkyl-aryl,
 C(NOR₆)NH-heteroaryl, C(NOR₆)NH-alkyl-heteroaryl,
 C(NOR₆)NH-heterocycloalkyl, C(NOR₆)NH-alkyl-heterocycloalkyl;
 25 R₅ is hydrogen;
- R₆ is hydrogen, alkyl, cycloalkyl, aryl, cycloalkylalkyl, arylalkyl,
 heteroaryl, heteroarylalkyl, heterocycloalkyl or heterocycloalkylalkyl;
- R₇ and R₈ are independently hydrogen, alkyl, substituted alkyl,
 cycloalkyl, aryl, substituted aryl, cycloalkylalkyl, arylalkyl, heteroaryl,
 30 substituted heteroaryl, heteroarylalkyl, heterocycloalkyl,
 heterocycloalkylalkyl;

m is an integer of 0 to 2; and

n is an integer of 1 to 3.

5. The compounds as recited in Claim 1, wherein

5 R_1 and R_2 are independently hydrogen, fluorine or alkyl;



wherein Y is NR_9 ;

R_4 is alkyl, cycloalkyl, aryl, cycloalkylalkyl, arylalkyl, heteroaryl, heteroarylalkyl, heterocycloalkyl,

10 heterocycloalkylalkyl; or

CO-alkyl, CO-cycloalkyl, CO-aryl, CO-alkyl-cycloalkyl, CO-alkyl-aryl, CO-heteroaryl, CO-alkyl-heteroaryl, CO-heterocycloalkyl, CO-alkyl-heterocycloalkyl; or

CONH-alkyl, CONH-cycloalkyl, CONH-aryl, CONH-alkyl-cycloalkyl,

15 CONH-alkyl-aryl, CONH-heteroaryl,

CONH-alkyl-heteroaryl, CONH-heterocycloalkyl,

CONH-alkyl-heterocycloalkyl; or

COO-alkyl, COO-cycloalkyl, COO-aryl, COO-alkyl-cycloalkyl,

COO-alkyl-aryl, COO-heteroaryl, COO-alkyl-heteroaryl,

20 COO-heterocycloalkyl, COO-alkyl-heterocycloalkyl; or

SO₂-cycloalkyl, SO₂-aryl, SO₂-alkyl-cycloalkyl, SO₂-alkyl-aryl,

SO₂-heteroaryl, SO₂-alkyl-heteroaryl, SO₂-heterocycloalkyl,

SO₂-alkyl-heterocycloalkyl; or

C(NCN)NH-alkyl, C(NCN)NH-cycloalkyl, C(NCN)NH-aryl,

25 C(NCNNH)-alkyl-cycloalkyl, C(NCN)NH-alkyl-aryl,

C(NCN)NH-heteroaryl, C(NCN)NH-alkyl-heteroaryl,

C(NCN)NH-heterocycloalkyl, C(NCN)NH-alkyl-heterocycloalkyl; or

C(NNO₂)NH-alkyl, C(NNO₂)NH-cycloalkyl, C(NNO₂)NH-aryl,

C(NNO₂)NH-alkyl-cycloalkyl, C(NNO₂)NH-alkyl-aryl,

C(NNO₂)NH-heteroaryl, C(NNO₂)NH-alkyl-heteroaryl,
C(NNO₂)NH-heterocycloalkyl, C(NNO₂)NH-alkyl-heterocycloalkyl;

or

C(NH)NH-alkyl, C(NH)NH-cycloalkyl, C(NH)NH-aryl,
5 C(NH)NH-alkyl-cycloalkyl, C(NH)NH-alkyl-aryl,
C(NH)NH-heteroaryl, C(NH)NH-alkyl-heteroaryl,
C(NH)NH-heterocycloalkyl, C(NH)NH-alkyl-heterocycloalkyl; or

C(NH)NHCO-alkyl, C(NH)NHCO-cycloalkyl, C(NH)NHCO-aryl,
C(NH)NHCO-alkyl-cycloalkyl, C(NH)NHCO-alkyl-aryl,
10 C(NH)NHCO-heteroaryl, C(NH)NHCO-alkyl-heteroaryl,
C(NH)NHCO-heterocycloalkyl,
C(NH)NHCO-alkyl-heterocycloalkyl; or

C(NOR₆)NH-alkyl, C(NOR₆)NH-cycloalkyl, C(NOR₆)NH-aryl,
C(NOR₆)NH-alkyl-cycloalkyl, C(NOR₆)NH-alkyl-aryl,
15 C(NOR₆)NH-heteroaryl, C(NOR₆)NH-alkyl-heteroaryl,
C(NOR₆)NH-heterocycloalkyl, C(NOR₆)NH-alkyl-heterocycloalkyl;

R₅ is hydrogen;

R₆ is hydrogen, alkyl, cycloalkyl, aryl, cycloalkylalkyl, arylalkyl,
heteroaryl, heteroarylalkyl, heterocycloalkyl or heterocycloalkylalkyl;

20 R₇ and R₈ are independently hydrogen, alkyl, substituted alkyl,
cycloalkyl, aryl, substituted aryl, cycloalkylalkyl, arylalkyl, heteroaryl,
substituted heteroaryl, heteroarylalkyl, heterocycloalkyl,
heterocycloalkylalkyl;

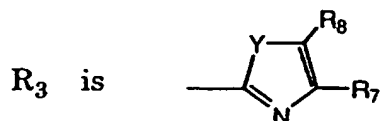
R₉ is hydrogen, alkyl, cycloalkyl, aryl, cycloalkylalkyl, arylalkyl,
25 heteroaryl, heteroarylalkyl, heterocycloalkyl or heterocycloalkylalkyl;

m is an integer of 0 to 2; and

n is an integer of 1 to 3.

6. The compounds as recited in Claim 1, wherein

30 R₁ and R₂ are independently hydrogen, fluorine or alkyl;



wherein Y is oxygen;

R₄ is CO-alkyl, CO-alkyl-aryl, CO-cycloalkyl, CO-alkyl-heteroaryl,
CO-alkyl-heteroalkyl, CO-alkyl-heterocycloalkyl, aryl, arylalkyl,

5 heteroaryl, heteroarylalkyl, CONH-alkyl,

CONH-alkyl-aryl, CONH-cycloalkyl, or CONH-alkyl-heterocycloalkyl;

R₅ is hydrogen; and

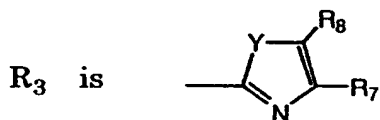
R₇ and R₈ are hydrogen;

m is the integer 0; and

10 n is the integer 1.

7. The compounds as recited in Claim 1, wherein

R₁ and R₂ are independently hydrogen, fluorine or alkyl;



15 wherein Y is oxygen;

R₄ is CO-alkyl, CO-alkyl-aryl, CO-alkyl-heteroalkyl, CO-cycloalkyl,
CO-alkyl-heterocycloalkyl, CO-alkyl-heteroaryl, aryl, arylalkyl,

heteroaryl, heteroarylalkyl, CONH-alkyl,

CONH-alkyl-aryl, CONH-cycloalkyl, or CONH-alkyl-heterocycloalkyl;

20 R₅ is hydrogen;

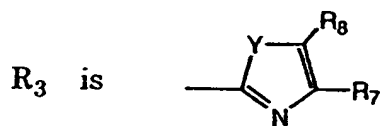
R₇ and R₈ are alkyl;

m is the integer 0; and

n is the integer 1.

25 8. The compounds as recited in Claim 1, wherein

R₁ and R₂ are independently hydrogen, fluorine or alkyl;



wherein Y is oxygen;

- R₄ is CO-alkyl, CO-alkyl-aryl, CO-alkyl-heteroalkyl, CO-cycloalkyl, CO-alkyl-heterocycloalkyl, CO-alkyl-heteroaryl, aryl, arylalkyl, heteroaryl, heteroarylalkyl, CONH-alkyl, CONH-alkyl-aryl, CONH-cycloalkyl, or CONH-alkyl-heterocycloalkyl;

R₅ is hydrogen;

R₇ is hydrogen;

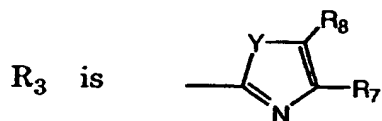
R₈ is alkyl;

m is the integer 0; and

n is the integer 1.

9. The compounds as recited in Claim 1, wherein

R₁ and R₂ are independently hydrogen, fluorine or alkyl;



wherein Y is oxygen;

- R₄ is CO-alkyl, CO-alkyl-aryl, CO-alkyl-heteroalkyl, CO-cycloalkyl, CO-alkyl-heterocycloalkyl, CO-alkyl-heteroaryl, aryl, arylalkyl, heteroaryl, heteroarylalkyl, CONH-alkyl, CONH-alkyl-aryl, CONH-cycloalkyl, or CONH-alkyl-heterocycloalkyl;

R₅ is hydrogen;

R₇ is alkyl;

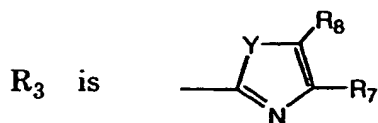
R₈ is hydrogen;

m is the integer 0; and

n is the integer 1.

10. The compounds as recited in Claim 1, wherein

R₁ and R₂ are independently hydrogen, fluorine or alkyl;



wherein Y is sulfur;

- R₄ is CO-alkyl, CO-alkyl-aryl, CO-alkyl-heteroalkyl, CO-cycloalkyl,
CO-alkyl-heterocycloalkyl, CO-alkyl-heteroaryl, aryl, arylalkyl,
5 heteroaryl, heteroarylalkyl, CONH-alkyl,
CONH-alkyl-aryl, CONH-cycloalkyl, or CONH-alkyl-heterocycloalkyl;

R₅ is hydrogen;

R₇ is hydrogen;

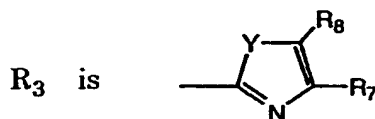
R₈ is alkyl;

10 m is the integer 0; and

n is the integer 1

11. The compounds as recited in Claim 1, wherein

R₁ and R₂ are independently hydrogen, fluorine or alkyl;



15

wherein Y is sulfur;

- R₄ is CO-alkyl, CO-alkyl-aryl, CO-alkyl-heteroalkyl, CO-cycloalkyl,
CO-alkyl-heterocycloalkyl, CO-alkyl-heteroaryl, aryl, arylalkyl,
heteroaryl, heteroarylalkyl, CONH-alkyl,
20 CONH-alkyl-aryl, CONH-cycloalkyl, or CONH-alkyl-heterocycloalkyl;

R₅ is hydrogen;

R₇ is alkyl;

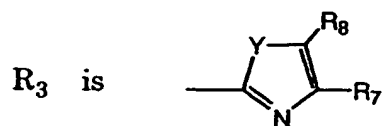
R₈ is hydrogen;

m is the integer 0; and

25 n is the integer 1.

12. The compounds as recited in Claim 1, wherein

R₁ and R₂ are independently hydrogen, fluorine or alkyl;



wherein Y is NR_9 ;

R_4 is CO-alkyl, CO-alkyl-aryl, CO-alkyl-heteroalkyl, CO-cycloalkyl, CO-alkyl-heterocycloalkyl, CO-alkyl-heteroaryl, aryl, arylalkyl,

5 heteroaryl, heteroarylalkyl, CONH-alkyl,

CONH-alkyl-aryl, CONH-cycloalkyl, or CONH-alkyl-heterocycloalkyl;

R_5 is hydrogen;

R_7 is hydrogen;

R_8 is alkyl;

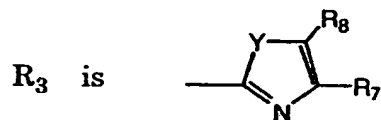
10 R_9 is hydrogen, alkyl, cycloalkyl, aryl, alkyl-cycloalkyl, alkyl-aryl, heteroaryl, alkyl-heteroaryl, heterocycloalkyl, or alkyl-heterocycloalkyl;

m is the integer 0; and

n is the integer 1.

15 13. The compounds as recited in Claim 1, wherein

R_1 and R_2 are independently hydrogen, fluorine or alkyl;



wherein Y is NR_9 ;

R_4 is CO-alkyl, CO-alkyl-aryl, CO-alkyl-heteroalkyl, CO-cycloalkyl,

20 CO-alkyl-heterocycloalkyl, CO-alkyl-heteroaryl, aryl, arylalkyl, heteroaryl, heteroarylalkyl, CONH-alkyl,

CONH-alkyl-aryl, CONH-cycloalkyl, or CONH-alkyl-heterocycloalkyl;

R_5 is hydrogen;

R_7 is alkyl;

25 R_8 is hydrogen;

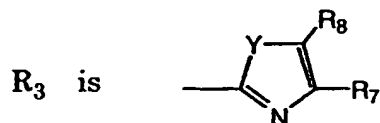
R_9 is alkyl;

m is the integer 0; and

n is the integer 1.

14. The compounds as recited in Claim 1, wherein

R_1 and R_2 are independently hydrogen, fluorine or alkyl;



5 wherein X is NR_9 ;

R_4 is CO-alkyl, CO-alkyl-aryl, CO-cycloalkyl, CO-alkyl-heteroaryl,
CO-alkyl-heteroalkyl, CO-alkyl-heterocycloalkyl, aryl, arylalkyl,
heteroaryl, heteroarylalkyl, CONH-alkyl,
CONH-alkyl-aryl, CONH-cycloalkyl, or CONH-alkyl-heterocycloalkyl;

10 R_5 is hydrogen;

R_7 is alkyl;

R_8 is hydrogen;

R_9 is hydrogen;

m is the integer 0

15 n is the integer 1.

15. The compound as recited in Claim 1, which is

N-[5-[[5-Ethyl-2-oxazolyl)methyl]thio]-2-thiazolyl]acetamide;

N-[5-[[5-Ethyl-2-oxazolyl)methyl]thio]-2-thiazolyl]benzamide;

20 N-[5-[[4,5-Dimethyl-2-oxazolyl)methyl]thio]-2-thiazolyl]acetamide;

N-[5-[[5-*t*-Butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]acetamide;

N-[5-[[5-*t*-Butyl-2-oxazolyl)methyl]thio]-2-

thiazolyl]trimethylacetamide;

N-[5-[[4-Ethyl-2-oxazolyl)methyl]thio]-2-thiazolyl]acetamide;

25 N-[5-[[5-*t*-Butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]-N'-cyano-
N''-(2,6-difluorophenyl)guanidine;

N-[5-[[5-Isopropyl-2-oxazolyl)fluoromethyl]thio]-2-thiazolyl
acetamide;

30 N-[5-[[5-*t*-Butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]
aminophenyl-4-(2-hydroxyethyl)sulfonamide;

N-[5-[[[(5-t-butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]aminophenyl-4-sulfonamide;

N-[5-[[[(5-t-butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]-4-aminopyrimidine;

5 N-[5-[[[(5-t-butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]-3-(hydroxymethyl)aniline;

N-[5-[[[(5-t-butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]-2-aminopyridine;

10 N-[5-[[[(5-t-butyl-2-oxazolyl)methyl]thio]-2-thiazolyl]-2-[5-[[[(3-hydroxy-2,2-dimethyl)propyl)amino)methyl]] aminopyridine; or
a pharmaceutically acceptable salt thereof.

16. A pharmaceutical composition comprising a compound of Claim 1 and a pharmaceutically acceptable carrier.

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17. A pharmaceutical composition comprising a compound of Claim 1, in combination with a pharmaceutically acceptable carrier, and an anti-cancer agent formulated as a fixed dose.

20 18. A pharmaceutical composition comprising a compound of Claim 1, in combination with a pharmaceutically acceptable carrier, and a modulator of p53 transactivation formulated as a fixed dose.

19. A pharmaceutical composition according to claim 16, comprising a
25 compound of Claim 1 in combination with a pharmaceutically acceptable carrier, with an anticancer treatment or anticancer agent administered in sequence.

20. The pharmaceutical composition according to Claim 18, wherein
30 said combination comprising said compound of Claim 1 and said

pharmaceutically acceptable carrier, is administered prior to administration of said anticancer treatment or anticancer agent.

21. The pharmaceutical composition according to claim 18, wherein said
5 combination comprising said compound of Claim 1 and said pharmaceutically acceptable carrier, is administered after administration of said anticancer treatment or anticancer agent.

22. A method of inhibiting protein kinases which comprises administering
10 to a mammalian specie in need thereof an effective protein kinase inhibiting amount of a compound of Claim 1.

23. A method of inhibiting cyclin dependent kinases which comprises
15 administering to a mammalian specie in need thereof an effective cyclin dependent kinase inhibiting amount of a compound of Claim 1.

24. A method of inhibiting cdc2 (cdk1) which comprises administering to a
mammalian specie in need thereof an effective cdc2 inhibiting amount of a
compound of Claim 1.
20

25. A method of inhibiting cdk2 which comprises administering to a
mammalian specie in need thereof an effective cdk2 inhibiting amount of a
compound of Claim 1.

26. A method of inhibiting cdk3 which comprises administering to a
25 mammalian specie in need thereof an effective cdk3 inhibiting amount of a compound of Claim 1.

27. A method of inhibiting cdk4 which comprises administering to a
30 mammalian specie in need thereof an effective cdk4 inhibiting amount of a compound of Claim 1.

28. A method of inhibiting cdk5 which comprises administering to a mammalian specie in need thereof an effective cdk5 inhibiting amount of a compound of Claim 1.

5

29. A method of inhibiting cdk6 which comprises administering to a mammalian specie in need thereof an effective cdk6 inhibiting amount of a compound of Claim 1.

10 30. A method of inhibiting cdk7 which comprises administering to a mammalian specie in need thereof an effective cdk7 inhibiting amount of a compound of Claim 1.

15 31. A method of inhibiting cdk8 which comprises administering to a mammalian specie in need thereof an effective cdk8 inhibiting amount of a compound of Claim 1.

20 32. A method for treating proliferative diseases comprising administering to a mammalian specie in need thereof a therapeutically effective amount of a composition of Claim 16.

25 33. A method for treating cancer comprising administering to a mammalian specie in need thereof a therapeutically effective amount of a composition of Claim 16.

30 34. A method for treating inflammation, inflammatory bowel disease, or transplantation rejection, comprising administering to a mammalian specie in need thereof a therapeutically effective amount of a composition of Claim 16.

35. A method for treating arthritis comprising administering to a mammalian specie in need thereof a therapeutically effective amount of a composition of Claim 16.
- 5 36. A method for treating infection by HIV, or for treating and preventing the development of AIDS, comprising administering to a mammalian specie in need thereof a therapeutically effective amount of a composition of Claim 16.
- 10 37. A method for treating viral infections, comprising administering to a mammalian specie in need thereof a therapeutically effective amount of a composition of Claim 16.
38. A method for treating fungal infections, comprising administering to a mammalian specie in need thereof a therapeutically effective amount of a composition of Claim 16.
- 15 39. A method for preventing the development of cancer or tumor relapse, comprising administering to a mammalian specie in need thereof a therapeutically effective amount of a composition of Claim 16.
- 20 40. A method for treating neurodegenerative disease, comprising administering to a mammalian specie in need thereof a therapeutically effective amount of a composition of Claim 16.
- 25 41. A method for treating proliferative diseases comprising administering to a mammalian specie in need thereof a therapeutically effective amount of a composition of Claim 17.

42. A method for treating cancer comprising administering to a mammalian specie in need thereof a therapeutically effective amount of a composition of Claim 17.

5 43. A method for preventing the development of cancer or tumor relapse, comprising administering to a mammalian specie in need thereof a therapeutically effective amount of a composition of Claim 17.

44. A method for treating proliferative diseases comprising administering
10 to a mammalian specie in need thereof a therapeutically effective amount of a composition of Claim 18.

45. A method for treating cancer comprising administering to a mammalian specie in need thereof a therapeutically effective amount of a
15 composition of Claim 18.

46. A method for preventing the development of cancer or tumor relapse, comprising administering to a mammalian specie in need thereof a therapeutically effective amount of a composition of Claim 18.

INTERNATIONAL SEARCH REPORT

Int. Patent Application No.

PCT/US 00/33037

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C07D277/54 C07D417/12 C07D417/14 A61K31/427 A61P35/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C07D A61K A61P

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

CHEM ABS Data, BEILSTEIN Data, WPI Data, EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 99 24416 A (BRISTOL-MYERS SQUIBB COMPANY) 20 May 1999 (1999-05-20) the whole document	1-46

☐ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

9 March 2001

Date of mailing of the international search report

19/03/2001

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Allard, M

INTERNATIONAL SEARCH REPORT

Information on patent family members

In International Application No

PCT/US 00/33037

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9924416 A	20-05-1999	AU 1295599 A	31-05-1999
		BR 9814124 A	03-10-2000
		EP 1042307 A	11-10-2000
		NO 20002153 A	11-05-2000
		US 6040321 A	21-03-2000

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